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UTCS Computer News

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We're Moving

AGAIN !

- The UTCS Information Centre and the Communications and Technical Support Group are moving to (hopefully) their permanent home in the Bancroft Building (the old Textbook Store). The groups moving (and the dates during which services will be unavailable from these groups) include:

Information Centre

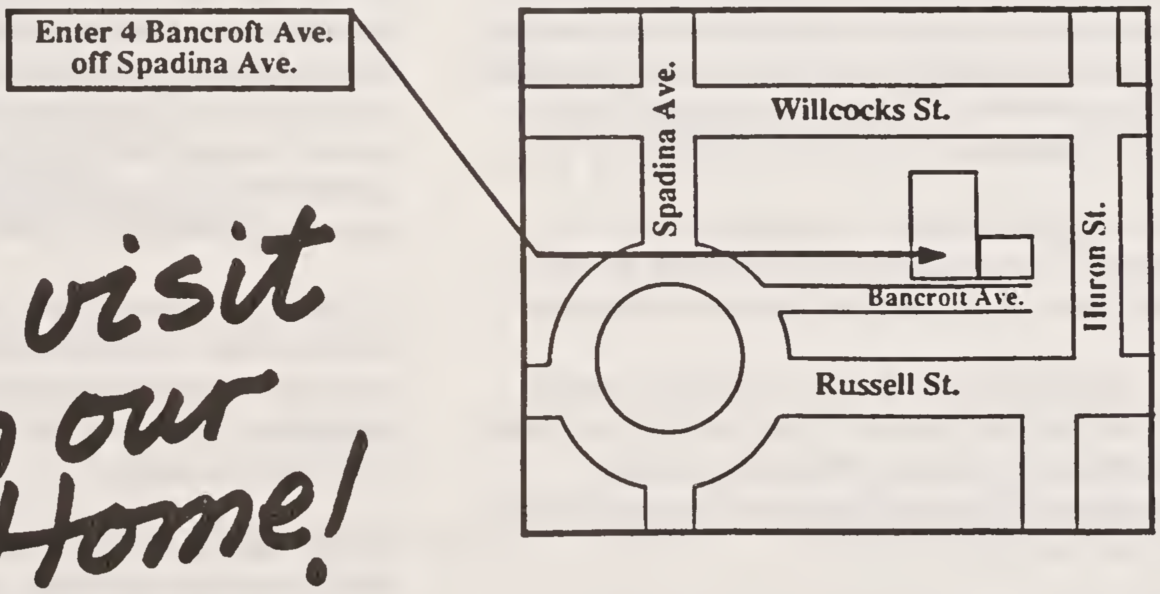
Advising & Consulting
Applications Support
Education Facility & Education Office
Information Office & Technical Reference Library
Marketing
Micro Lab & Micro Support Group
Publications
Statistical & Numerical Analysis Group
Text & Imaging Support Group

CLOSED OCTOBER 28, 29, 30

(Phone-in Advising will be available throughout the move)

Communications and Technical Support Group

Hardware & Communications
Installation & Maintenance
Network & Development Support
Terminal Rental Pool


Enter 4 Bancroft Ave. off Spadina Ave.

Come visit us in our new Home!

Networking: A CMS Perspective

Steve Younker YOUNKER at UTORONTO
Ted Sikorski TED at UTORONTO

If you have been using computers at all in the last couple of years, or know someone who has, you have probably run into the term "E-mail." If not, your computer jargon vocabulary is about to increase: E-mail simply stands for Electronic Mail. E-mail allows you to send letters, files, or manuscripts to colleagues around the campus or around the world, usually in just minutes.

The University of Toronto is connected to several computer networks that serve various parts of the world. One of the networks in Canada is NetNorth, which is made up of academic and research institutions connected by telephone lines 24 hours a day. Most major universities in Canada are members; they are listed at the end of this article. NetNorth is associated with two similar networks, EARN and BITNET. EARN (the European Academic Research Network) connects most of Western Europe, parts of Africa, and Israel. BITNET covers the USA, Japan, and parts of East Asia.

BITNET can also be used as a generic term referring to all three networks. Thus, when asked for your BITNET address (and you are in Canada), you are really being asked for your NetNorth address.

The academic networks are growing in leaps and bounds. Two years ago about 700 nodes, or computers, were connected; today, there are just over 2000. When you consider that many of these nodes have still other computers attached to them, you can see that the network is accessible to thousands of users. The potential for academic interaction is enormous.

At first, some people wonder, "What can I use this network for?" The answers to this question are many. Here are just a few uses for the academic networks.

- Establishing contacts with people of similar interests across the country and around the world. The exchange of ideas can promote useful discussion among academics and lead to interesting new research directions.
- Sending or receiving manuscripts to and from colleagues for critical comment or publication. (Don't be surprised if, in the future, the various publishing houses are connected to the academic networks.)
- Sending or receiving the agenda for a conference. (It is not unusual for most arrangements for conferences and seminars to be made through E-mail.)
- Sending or receiving data for academic projects.
- Sending or receiving files to and from other computer networks. Some other computer networks that you can contact through NetNorth are:

JANET	the UK academic network
UUCP	a UNIX machine network
CDNnet	another Canadian academic network
CSnet	a worldwide Computer Science Department network
ARPAnet	the US Defence Research network

- Interdepartmental and campus-wide mail and memos. (This really cuts down on telephone tag.)

A rapidly growing number of people at U of T are directly attached to a mainframe computer that is on NetNorth or to a departmental computer that can access one of these computers. In addition, Simcoe Hall and some of the Deans' offices on campus are currently experimenting with interoffice E-mail. The University's Cray supercomputer is accessible to anybody on NetNorth, EARN, or BITNET.

To use E-mail here, all you need is an account on one of the campus computers attached to the network. You can use the network directly through one of these computers or by using your own micro if remote attachment is allowed.

Do you want more information on NetNorth? You can attend a one hour seminar, which is given periodically throughout the year. Check this issue of *ComputerNews* for the date of the next presentation. If you have further questions, you can call Advising Services at 978-HELP.

continued...

Networking: continued.

Canadian Institutes on NetNorth

- Acadia University
- Bell Northern Research
- Brock University
- Carleton University
- Chalk River Nuclear Labs
- CIT Computer Resources
- Centennial College
- Concordia University
- Dalhousie University
- Ecole Polytechnique
- Humber College
- Lakehead University
- Laurentian University
- Laval University
- McGill University
- McMaster University
- Memorial University of Newfoundland
- Mount Allison University
- Mount St. Vincent University
- National Research Council
- Queens University
- Royal Military College
- Ryerson
- St. Mary's University
- Seneca College
- Simon Fraser University
- Trent University
- Université de Montréal
- Université du Quebec à Hull
- Université du Quebec à Montréal
- University of Alberta
- University of British Columbia
- University of Calgary
- University of Guelph
- University of Laval
- University of Manitoba
- University of Moncton
- University of New Brunswick
- University of Ottawa
- University of Prince Edward Island
- University of Regina
- University of Saskatchewan
- University of Sherbrooke
- University of Toronto
- University of Victoria
- University of Waterloo
- University of Western Ontario
- University of Windsor
- University of New Brunswick
- Wilfred Laurier University
- York University

If you have an account on UTCS' VM/CMS system, you can see a complete list of NetNorth/BITNET/EARN members by typing:

```
help netnorth nodes
```

Free NetNorth (Electronic Mail) Demonstration

November 18, 1987
4:00 - 5:00 p.m.

Anyone interested in sending documents to colleagues or friends reliably, quickly, and inexpensively will not want to miss this demonstration. We will introduce you to the NetNorth/BITNET/EARN communications network, which is accessible from the CMS system. This network connects more than a thousand universities and research institutes in Europe, Asia, and North America. Sending documents or files over the network is very easy to learn.

The demonstration will last just under an hour. Included will be how to send mail and files to another institution and how to talk directly to someone on the network. *Please note that this is a demonstration only.*

Space is limited. If you would like to attend, please contact me at 978-4565 to reserve a place.

Irene Rosiecki
ROSIECKI at UTORONTO

ProComm Communications Program Seminar

November 18, 1987
12:00 - 2:00 p.m.

ProComm is a general purpose communications program currently available to all U of T faculty, staff, and students. It is the resident communications program in the Education Facility.

A seminar has been scheduled to introduce ProComm and its various features: terminal emulation (a number of popular ones will be reviewed); the dialing directory; file transfer protocols, such as Kermit and XMODEM; command files to control automatic logon and unattended operation; and the DOS gateway, which allows you to execute DOS commands and other programs while you are still in ProComm.

The seminar is free of charge; copies of ProComm are also made available at no charge, but you must bring your own diskettes.

To reserve a place in this seminar, please phone me at 978-4565.

Irene Rosiecki
ROSIECKI at UTORONTO

Subscription Renewals

Martha Parrott
PARROTT at UTORONTO

It is now time for *ComputerNews* readers to renew their subscriptions. Because all subscriptions run from January to January, even new users, who become subscribers automatically when they open a UTCS account, must renew at this time if they wish to continue receiving *ComputerNews.*

To renew, just fill out the ***Annual ComputerNews Subscription Renewal Form*** appearing opposite this article and in the December issue. Any subscription not renewed by the beginning of January will be dropped.

Please remember that this policy helps us keep our mailing costs down and continue to provide the newsletter free of charge.

An Updated Report on OS/2

Paul Roth
PROTH at UTORONTO

Several articles in the May/June *ComputerNews* presented what was then known about IBM's new Personal System/2 machines and Operating System/2 (OS/2), announced in April. Since then, I have had an opportunity to work with a prerelease version of OS/2; this article will update and supplement the information already presented on OS/2.

First of all, when will it be here? Firm dates are still unavailable, but there are some new speculative ones. Release 1.0 of the "Standard Edition" may be out in February or March 1988. Release 1.1, which will include the Presentation Manager (similar to Microsoft Windows), is still slated for "later," although it may appear simultaneously with 1.0. The "Extended Edition" is expected next summer. As you may recall, it will include a Communications Manager and a Database Manager; some features of the latter are described later in this article.

Hardware requirements for OS/2 were documented at length in the May/June issue, but now that I have worked with the product, I would like to add my impressions. You will need at least 1.5 megabytes (MB) of RAM, 2MB if you wish to run a DOS Compatiblity Box as well (see below). In general, the more RAM you have, the better; 3MB seems to me to be a realistic starting point.

Some of you may be wondering whether older machines, such as the IBM PC or XT, might be able to run OS/2 if an "accelerator board" is installed to accommodate the faster 80286 microchip. According to IBM representatives, OS/2's large RAM requirement probably makes this futile[1] Some determined third-party developers may look for a way around this, however, since the potential market is too large to ignore.

Real Mode vs Protected Mode

The 80286 chip (part of the hardware needed to run OS/2) provides two modes of operation. The first, called real mode, is what PC DOS uses. A DOS Compatibility Box operates in real mode and lets you run a PC-DOS program even though your machine is using OS/2.

It is the second mode, protected mode, that is heavily used by OS/2. OS/2 allows up to 16 separate programs to run simultaneously, each containing multiple tasks up to a system limit of 255 total tasks over all processes. Each program can run in a memory space larger than 640KB, with the total of all processes bound by the physical amount of memory installed in your machine, up to 16MB.[2]

The advantage of protected mode is that if one process fails, other processes are protected, i.e., they will continue to run. In real mode, however, if the process crashes, the whole machine crashes with it, including any other processes in protected mode that may be running.[3] In other words, there is no "protection" when the chip is in real mode.

Note you will not have to purchase PC-DOS 3.3 to make use of the Compatibility Box; it's built in to OS/2.

Miscellaneous Facts about OS/2

- OS/2 will use the same file structure as PC DOS 3.x; no change to existing files or filenames is necessary to access PC DOS files.

continued...

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[1] The main problem is the size of memory addressing: if RAM comes on the 286 board, it may be used, but then RAM on the motherboard is unusable. Even then, the BIOS must recognize that OS/2 is to run. Another problem is how to install OS/2, since it is distributed on 1.2MB floppies and requires over 800KB to load and install: how do you read it in on a PC or XT machine?

[2] Because of the way memory addressing is handled in real mode, only 1MB of memory is available, with the memory above 640KB used as "overhead," hence the infamous DOS 640KB limitation on the size of an application. By contrast, protected mode allows memory addressing up to 16MB.

[3] When a real-mode process is running, even with other protected-mode tasks running, the system is susceptible to crashing. This is because when you are using a Compatibility Box, the 80286 chip actually flips back and forth from real to protected mode.

An Updated Report on OS/2 continued.

- OS/2 and PC DOS have similar command sets, with most DOS commands behaving the same way in OS/2. OS/2 of course has some new commands.
- Existing DOS applications that use communications, run in real-time, or use extended memory will most likely not run (without change) in OS/2's Compatibility Box. The first two cases will encounter problems because of timing dependence, since the DOS process only gets control of the chip during its own time slice, not in real time. Extended memory will probably cause memory addressing problems.
- In Release 1.1, which uses the Presentation Manager in graphics mode, the IBM Monochrome Display Adapter and IBM Professional Display Adapters are NOT supported. DOS Mode programs will run in CGA or EGA mode.
- For application development, OS/2 allows a feature called "Dynamic Linking." It works like this. Suppose your program has a main routine with three possible branches, the third of which is hardly ever needed (an error-processing subroutine, for instance). When you compile and link the program, you indicate to the OS/2 Linker that the third branch is to be dynamically linked. The .EXE file then built will contain all the program code except for the third branch. When the .EXE file is run, the code for the third branch is not loaded. Only if the third branch is required is it read from disk and loaded by OS/2. This saves memory, disk space, and loading time, while allowing subroutine libraries to be dynamically linked by several different programs.
- "Family" programs are applications that use only a subset of the OS/2 function calls. Their code is linkedited in such a way that they can run in OS/2, or on a PC or XT under PC DOS, without change. IBM believes that most early applications developed for OS/2 will be family applications; later on, most will be full-function, OS/2-only applications.
- Release 1.1 has improved text support: character fonts, proportional spacing, font creation, and mixed text and graphics are all supported. The improved user interface allows multiapplication windowing, mouse support, and copying data between windows (i.e., between applications).

  National language support is improved (11 languages, 21 countries), and five character sets are supported. As well, double-byte character sets are enabled (e.g., for Chinese or Japanese), and operating system messages can be translated to any language.

  Note that in 1.1, a mouse is not needed to use the Presentation Manager; Function keys can be used instead.

- Command syntax is extended to include some UNIX-like features:

* DEL, DIR, TYPE, VOL, MD, RD accept multiple arguments

```
dir abc*.* def*.*
```

gives directory listing of files starting with ABC or DEF.

* Conditional processing:

```
dir abc.def && type abc.def
```

types ABC.DEF only if it exists. And

```
dir abc.def || echo Not There
```

echoes "Not There" only if ABC.DEF does not exist.

* Multiple statements:

```
prg1 & prg2
```

executes PRG1 and then PRG2.

* Handle redirection (0 std. input, 1 std. output, 2 std. error):

```
format b: 0<yes.yes 1>msg.txt 2>errs.txt
```

executes the FORMAT command without waiting for the Y. If successful, messages are redirected to MSG.TXT, else to ERRS.TXT. (YES.YES above would be a one-character file containing only the letter "Y".)

- Some new commands include SETLOCAL (sets a path for use during Batch file execution only);

continued...

An Updated Report on OS/2 continued.

DETACH (to start a process in the background); and SPOOL (to start the printer spooler in the background).

- Restrictions exist in the structure of OS/2 to enhance reliability and portability of software:
    - A user program cannot execute I/O and interrupts.
    - A user program cannot access the video buffer.
    - If either restriction is violated, the program is aborted by OS/2.

  All I/O is done via device drivers. With one exception related to high-priority processes, it is physically impossible in OS/2 for your program to talk to your data directly: it is done through a device driver.

- The *OS/2 Installation and Planning Guide* is available now from IBM. Its Form Number is G360-2650.

Look and Feel of OS/2

Installing OS/2 is almost trivial: just follow the directions on the screen to insert particular floppies. The hardest thing about learning to use OS/2 will probably be knowing when to alter the CONFIG.SYS file. Setting its parameters will require some detailed knowledge of how OS/2 works, but these are too numerous to mention here.

Release 1.0 will look this way. Once you have booted, OS/2 presents a menu where you may choose to open the PC DOS Compatiblity Box or one of many OS/2 command processors. Upon selection, the appropriate screen appears, either DOS or OS/2. OS/2 looks like DOS except that the OS/2 prompt is [C:\], instead of C:\>, the new DOS default.

It is easy at any time to return to the menu by pressing <Ctrl-Esc> or to cycle through all the running processes by pressing <Alt-Esc> repeatedly. As mentioned above, up to 16 processes can be running at once, but only one of those can be in DOS (real mode). These processes can run in the foreground or in the background, the difference being whether they appear to be running at the given prompt.

All of this is done by having a "virtual screen" for each process. As you move through processes, each screen is rewritten to its current status. If a process is inactive (if, for example, you are at the OS/2 prompt), then the screen will be unchanged each time you return to this process. You can even maintain different keyboard macros for each process; this avoids the problem of macros from different processes interfering with each other, which happens now when many Terminate and Stay Resident programs are running together.

Everything else appears pretty much as it does now in DOS 3.2 or 3.3.

OS/2 Extended Edition

The OS/2 Extended Edition will cost around $500 for an upgrade to Release 1.1 and will consist of the OS/2 Standard Edition plus the Communications Manager and Database Manager. IBM expects that large corporate customers, i.e., multisystem IBM users, will be attracted to Extended.

The Database Manager relies on SQL, IBM's relational database language. Consistency with other machines will be provided (it "will work with other SAA[4] machines which implement these standards"), and a high-level programming interface will be included. Thus it should be possible to link OS/2 on an AT to DB2 on an IBM mainframe. To provide "an easier migration path for customers," you will be able to import/export database tables to/from PC DOS files. A Query Manager will facilitate user requests, working in either prompt, command, or menu mode, each of which can be customized. Pop-up and overlaid multiple windows will provide the common user interface (conforming to SAA). The Database Manager is planned to accommodate the Token-Ring or PC Network, allowing local/remote transparency.

Conclusion

OS/2 is an exciting product. When the Presentation Manager is included, it will probably be even more exciting. As new releases evolve, updates will be essentially free with proof of previous purchase. If you are considering OS/2, start thinking about how to acquire more memory; you will need (and want) it.

---

[4] IBM's System Application Architecture (SAA) includes an attempt at standardizing the user interface to IBM programs across product lines, i.e., for IBM micros, minis, and mainframes. This is obviously intended to increase portability of applications and to allow smoother interaction among IBM machines in distributed environments.

The SAA user-interface standard corresponds roughly in intention to Apple's standardized user interface for all Macintosh machines.

Are You OS/2 Ready?

Alex Nishri
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ALEX at UTORONTO

A year ago you could buy a "stereo ready" television set, even though television programs were not yet broadcast with stereo sound. Now you can buy "OS/2 ready" computers, even though OS/2 is not quite available. If you are buying a computer today, should you get an OS/2 ready model?

OS/2 (Operating System/2) was announced by Microsoft and IBM on April 2. It is an advanced operating system that can be run instead of PC-DOS on some personal computers. A fairly detailed description of OS/2 was provided in the May/June *ComputerNews*, and an update article appears elsewhere in this issue. The first version of OS/2 is not expected to be generally distributed until early 1988, but the term "OS/2 ready" has sprung up everywhere, in advertising and among sales people.

Whether you decide to buy an OS/2 ready machine depends on whether you expect OS/2 to serve your future needs, how soon you expect the OS/2 applications you need will be available, whether you can afford OS/2, and many other factors as well. Ultimately you must make a personal choice. In this article, we will touch on some of the information that may help you decide.

Why run OS/2 instead of PC-DOS? OS/2 has many features – such as multitasking, virtual storage, large memory address space, and a graphics manager – formerly present only in larger mini- and mainframe computer operating systems. Although such features are not of themselves important to someone using the machine, they make it possible for developers to design more sophisticated applications. It is applications (e.g., word processors, database managers, statistics packages, graphics packages, communications packages) that make your computer useful.

As an example, let's take a look at graphics packages. OS/2 will include a graphics manager to help a graphics application put sophisticated graphics on your screen. Graphics packages running under PC-DOS are left to deal directly with the more complex EGA, CGA, or Hercules graphics card hardware. OS/2 will also permit use of up to 16 megabytes (MB) of RAM and large amounts of virtual storage. Since even simple graphics applications frequently require large amounts of RAM, PC-DOS' maximum of 640 kilobytes of RAM may mean that certain things cannot be done.

There is another important reason why you may have to run OS/2 someday. Eventually OS/2 may replace PC-DOS as the primary operating system for IBM Personal Computers and compatibles. When that happens, you may find the diminishing support for PC-DOS unacceptable. How soon can we expect that to happen? An IBM source has suggested an analogy with IBM mainframe DOS, which was replaced by IBM mainframe OS/VS2 fifteen years ago but is still supported by IBM today. Microsoft Chairman Bill Gates was more cautious when he predicted that within five years most users will be running OS/2.

Let's take a look at non-OS/2-ready machines. Any machine with an 8088- or 8086-based central processing unit (including the IBM PC, PC-XT, PC Portable, PS/2 Model 25, PS/2 Model 30, and all their clones) fall into this catagory. Machines of this type have been around for a long time, and their prices have been dropping dramatically. Many clones on the market today are not only cheaper, but also faster than the original IBM PC. By shopping around, you can often get good deals on these machines.

On the other hand, OS/2 ready machines, which use the newer 80286-based central processing units, are generally more expensive. They include the IBM PC-AT, PC-XT286, PS/2 Model 50, PS/2 Model 60, and their clones. Machines such as the PS/2 Model 80 are based on the still newer 80386 central processing unit, but these are usually even more expensive. (Beyond OS/2, operating systems may some day run on 80386-based machines but not on 80286-based machines.) Although machines of this type are more expensive, they generally perform better than 8086-and 8088-based machines. So even if you can't justify the expense of an 80286-based machine for future OS/2 use alone, you might need one to run your current PC-DOS applications faster.

What if you think you may need OS/2, but not for several years to come? Consider that as technology continues to advance, we can expect 80286 and 80386

continued...

Are You OS/2 Ready continued.

machines to drop in price as 8088 and 8086 are doing now. Depending on how many years you think you can live without OS/2, it may be more economical to buy a non-OS/2-ready machine, and then replace it in a few years.

Another consideration is that an OS/2 ready machine does not necessarily run OS/2 efficiently. First of all, at least 1.5MB of RAM is recommended, and larger amounts may be required, depending on what you want to use your machine for. You may need more fixed-disk space because OS/2 distribution diskettes have about 5MB of files; additional swap and history files may take up even more room. As well, the slower speed of some fixed disks, such as those of the PS/2 Model 50, may become very noticeable with OS/2.

Turning to operating systems, non-OS/2-ready machines can only run PC-DOS or MS-DOS. (PC-DOS is actually MS-DOS with a few small IBM enhancements.) Thus if you are buying such a machine, you might be concerned with the future of PC-DOS. For example, you might wonder if there will be more enhancements to PC-DOS. When asked that question at a recent SHARE conference, an IBM source replied, "IBM comes out with a new PC-DOS release once a year. The last release was in April." In fact, there is already a commitment to improve PC-DOS by allowing disks with over 32MB capacity to be accessed directly. It is also known that PC-DOS is being enhanced for national language support, which involves double-byte characters. And IBM has accepted requirements involving enhancements for performance and easy use. Also important to this discussion, IBM has accepted requirements for PC-DOS to coexist with OS/2. So, at least for the next while, it looks like PC-DOS will continue to evolve.

If you buy an OS/2 ready machine, you will be able to run PC-DOS or OS/2. Of course OS/2 is not out yet, so for now you will have to run PC-DOS. But if Microsoft and IBM are to be believed, OS/2 will be a rapidly evolving and well supported operating system. In fact, when questioned at the SHARE conference, someone from IBM indicated that OS/2 will enjoy support comparable to that provided by IBM for its well supported mainframe operating system, MVS.

What about available applications? You can get many applications for PC-DOS today. With over ten million copies of MS-DOS and PC-DOS sold, application vendors will find a huge market. In fact, Microsoft and IBM have come up with a method that application authors can use to write "family" products that will work under both OS/2 and PC-DOS. This suggests that, at least for the next few years, new releases of application software will be available for PC-DOS-based machines.

The situation with OS/2 is less clear. When the first release of OS/2 is finally distributed in 1988, no one knows how many vendors will have applications for it. One problem vendors face is that the first release of OS/2 will not have the Presentation Manager. (The Presentation Manager will provide a whole new look and feel to the system and is expected to be similiar to Macintosh windows and icons.) Microsoft has told vendors that all software developers should design their programs to run under the Presentation Manager. However, vendors who bought a prerelease version of OS/2 from Microsoft to get a head start on their development discovered they did not have a Presentation Manager. Inspired by a lucrative potential market of several million machines, vendors are working hard nonetheless to come out with products as soon as possible.

Another factor is cost. The lastest release of PC-DOS, Version 3.3, lists for $179, but many dealers include PC-DOS as part of a package deal for an IBM or clone machine, so your cost may be lower. For OS/2, on the other hand, IBM has announced a list price of $475. This is in addition to the higher cost of an 80386 or 80286 central processing unit based machine, extra RAM, extra fixed-disk space, and faster fixed disks.

In summary, both PC-DOS and OS/2 are backed by commitments from Microsoft and IBM. Both will exist for some time. Many applications for PC-DOS are available today, and vendors continue to develop more. OS/2, on the other hand, is not available yet. Although it is unknown how many vendors will have applications ready for the first OS/2 release, many OS/2 applications are expected to be available eventually.

continued...

Are You OS/2 Ready continued.

Whether to buy an OS/2 ready machine at this point is a personal decision. First you must determine what your future needs will be; then you can compare. OS/2 may offer advantages over PC-DOS, depending on your needs, but OS/2 is more expensive, and the machines needed to run it are more expensive.

If you need assistance in choosing the best machine for your needs, please call us at 978-HELP for an appointment to discuss your requirements.

Options for the Non-OS/2-Ready

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ALEX at UTORONTO

What if you already have, or even buy, a non-OS/2-ready machine and discover you really need some feature of OS/2? All may not be lost. First, for some OS/2 features, enhancements to PC-DOS can be purchased to provide equivalent function. For example, if you need more than 640 kilobytes (KB) of RAM for your Lotus 1-2-3 application under PC-DOS, you can purchase special hardware that will let you use up to 32 megabytes (MB). Unfortunately, such enhancements will not be supported by PC-DOS itself, so individual applications must support them directly. Thus although Lotus 1-2-3 may support your special over-640KB memory board, other applications might not.

The second option is to buy an 80286 expansion card. More and more, such cards are coming on the market. Microsoft itself announced such a card in August, called the Mach 20. A version of Mach 20 configured to run OS/2 and including 3.5MB of memory is expected to sell initially for $3000. You will also need a hard disk to run OS/2.

Finally, you can try to trade in your old machine toward a new OS/2 compatible one. Depending on when you decide to switch from PC-DOS to OS/2, future prices for OS/2 machines may well have declined substantially from today's.

Are Your Files Fragmented?

Reinhard Schuller
SCHULLER at UTORONTO

Does your favourite package – SAS/PC, WordPerfect or dBASE III – seem to take more time than it used to? The problem may be that you have fragmented files on your disk(s).

DOS writes data in small sections of the disk, called "sectors." However, DOS does not work with one sector but rather with groups of sectors, called "clusters." On a 360 kilobyte (KB) floppy disk, the cluster size is 1KB. Cluster size on hard disks larger than 10 megabytes (MB) depends on the DOS version used to configure, or format, the disk. On a 20MB hard disk configured with DOS 2.x, the cluster size is 8KB; on one configured with DOS 3.x, the cluster size is 2KB. Thus a file on an IBM PC-AT using DOS 3.2 takes up as many 2KB clusters as are needed.

When you tell DOS to erase a file, that file's clusters become available for a new file. For example, if you create a file five clusters long, DOS will look for five clusters in which to write it. Unfortunately, DOS will allocate the first available clusters, even if they are not near each other. Now, the time it takes to access a file is determined by how close the clusters are to each other. If all clusters are sequential, the file is "contiguous," and access is fast. If the clusters are spread over

continued...

Are Your Files Fragmented continued.

the disk, then the file is said to be "fragmented," and access will be slower. The more you create and delete files on your hard or floppy disk, the more likely you are to have fragmented files, resulting in increasingly longer data storage and retrieval times.

The PC-DOS CHKDSK command can tell you if your files are fragmented; it works on both hard disks and floppy disks. If you enter the command:

```
chkdsk *.*
```

you will see either this message on the screen:

```
All specified file(s) are contiguous.
```

or a message like this one:

```
c:\wordperf\thesis.ch1
  Contains 4 non-contiguous blocks.
c:\wordperf\thesis.ch2
  Contains 5 non-contiguous blocks.
```

You would have to check each subdirectory since the command (as shown) works for the current directory only. The example shows fragmented files in the WORDPERF subdirectory. The file THESIS.CH1 is spread over four "blocks" or areas of the disk, and the file THESIS.CH2 is located in five separate areas.

To bring the zip back to your disk, "repack" the data so that all clusters belonging to a file are contiguous. There are various ways to do this.

Let's deal with floppies first.

1. Use COPY to copy files to an unused or reformatted diskette; all files will be copied contiguously. If you use DISKCOPY instead of COPY, the new diskette will be an *exact* copy of the old one, and fragmented files will be left untouched.

2. You can repack a diskette directly by using software such as the shareware package DOG101A.ARC (Disk OrGanizer), which is available from the UTCS Bulletin Board. (See the next article.)

Now, hard disks.

1. You can purchase commercial software such as Disk Optimizer, Norton Utilities Advanced Edition 4.0, or the shareware program previously mentioned.

Do make a complete backup copy of the hard disk or floppy disk and read the documentation before trying to "defragment" your files.

If your applications require a lot of file creations and deletions, you should notice an improvement in access times once you have repacked your disk(s).

UNIVERSITY OF TORONTO
COMPUTING SERVICES (UTCS)
Hours of Service

Christmas and New Year's
(December 24, 1987 through January 1, 1988)

The hours of service for the above holiday weekend will be announced via system Broadcast and HOTNEWS messages closer to the holiday.

A Shareware Program: Disk OrGanizer - Version 1.01a

Reinhard Schuller
SCHULLER at UTORONTO

The preceding article discussed disk fragmentation: what it is and what it does to performance. This article describes how the shareware program Disk OrGanizer, available from the UTCS Bulletin Board System (BBS), is used with a hard disk. You will need an archiving program such as PKXARC to unpack the files downloaded from the BBS file DOG101A.ARC.

Disk OrGanizer's documentation is unpolished but straightforward and easily understood. Take care to read the documentation before you attempt to "defragment " a disk, since the program's author offers several cautions.

- Make a complete backup copy of the hard disk.
- Remove all copy-protected software from the hard disk according to the vendor's instructions.
- Do not have any background programs running when you are repacking the disk; the program DOG.EXE should be the only program running.
- If a power failure should occur during the procedure, problems may result; however, the program and DOS CHKDSK should solve these, and *of course* you have your complete backup.

The program can use one of four disk-packing orders: FAST, DIRECTORY, PACKED, and FRAGMENT. FAST leaves all unfragmented files untouched and attempts to fill in the available spaces with fragmented files. However, if a file does not fit into an available space, it may remain fragmented and occupy two or more areas on the disk. This may not be an optimal solution, but as the name suggests, it is fast. DIRECTORY packs the disk so that files in the same directory are close to each other and contiguous; files in the same subdirectories will be retrieved quickly. PACKED leaves files in order; it moves the clusters so that all files are contiguous and only one area of free disk space remains. The last order, FRAGMENTED, moves contiguous files to the outer tracks of the disk, where they will be accessed quickly; previously fragmented files will be made contiguous and will occupy the inner tracks. This strategy means that files that are likely to be modified (and thus possibly fragmented) are near the free disk space; future fragmentation will thus be more localized rather than across the entire disk.

The simplest setup for running the program is to have the file ORDER.DOG in the Root directory of the hard disk. This file tells the program which of the four packing methods will be used, and supplies some other options. In the following sample ORDER.DOG file, comments are preceded by a semicolon (;).

```
; Disk OrGanizer C:\ORDER.DOG file.
; You should make a file like this for each hard disk
; and put it into the Root directory of each hard disk.
; Don't forget to start file and directory names with a \
\command.com  ; These three files first
\config.sys
\autoexec.bat
[DIR]         ; I want directory order
\dos          ; I want these subdirectories first
\procomm
\wordperf
```

Typing the command: DOG causes the Disk OrGanizer to start working. It first reports the status of the disk, the number of contiguous and fragmented files and directories. The program also tells you how many clusters will have to be moved. You are prompted:

Do you wish to continue?

Answer Y, and the disk will be repacked; answer N, and the DOS prompt returns. The first time you run the program, it may take some time, since the disk may be extremely fragmented. Regular disk maintenance, with this program or a similar one, will keep your hard-disk access fast.

Bell Canada Testing UTCS Dial-up Lines

Jon Alexander
JON at UTORONTO

Many of you have witnessed the recent problems with dial-up connection to UTCS over the phone lines. These problems have included locking of the terminal, garbage characters appearing on the screen during a session, and the inability of a modem to "hear" and connect with the UTCS computer on the other end. With UTCS cooperation, technical staff from Bell Canada have been testing the telephone system equipment in an attempt to resolve this problem. This article explains briefly how they are approaching the problem, so that you are kept up-to-date.

The data sent over the phone lines, between your modem and the modem equipment at UTCS, is carried by sound tones "modulated" (controlled and altered) by the modem equipment. The sound tones combine to form one composite tone, commonly called the "carrier signal." This is the sound you hear from your modem's speaker or the telephone receiver, when you listen in. To date, Bell Canada's testing has involved this tone and the way it is being sent.

The sound tones sent over the phone lines, which are used to represent both your own voice and data from your computer, are generated by sound "waves" in the air. These sound waves are invisible, but in practical terms, they act a lot like waves in water. As you know, a wave has peaks and valleys, which can vary both in their height and depth and in the number of times they occur in a given amount of time. Even if two waves are equal in these respects, they can differ in the time at which the peaks and valleys occur. Such a difference is called a "phase shift" (see Figure 1 below).

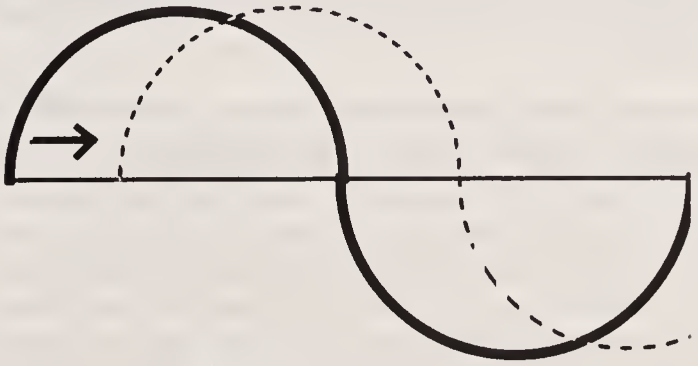

Figure 1

One of the possibilities Bell Canada is examining is that there might be a phase shift between some of the sound waves that make up the tone you hear being passed between two computer modems. Phase shifting can be significant because the most common type of modem uses phase shift purposely to send data within the sound tones sent between the modems. (You can hear this tone if you listen, but it is difficult to discern the change in phase angle that is happening.) This is referred to as "phase modulation," or "controlling the change in phase" in order to add information to the sounds going over the phone line. (Note: this term is similar to two familiar terms, "amplitude modulation" or A.M., and "frequency modulation" or F.M., two methods used to send sound waves that you can receive on your radio.)

Another problem being examined has to do with the carrier signal. The carrier signal carries information at set time intervals, so that the answering modem can detect the difference between an unaltered tone and a tone that has been modulated to carry information. Bell staff indicate that there may be a delay in the time at which the carrier signal's information should arrive at the answering end of the connection; such a delay might be caused by the way in which the phone company equipment carries the signal.

The Bell technicians have also been testing the "frequency response" of their telephone equipment when used with a modem. Frequency response is the range of frequencies that the equipment is able to transmit, from high-pitched to low-pitched sounds.

The phone lines carry the carrier signal, but they can also carry "background noise," noise that is clearly not supposed to be part of signal and that can confuse the answering modem. Bell has been measuring the "intensity" (often informally called "loudness") of this noise, and comparing it to specifications that have been set for Bell equipment. In some cases, you can hear this background noise (as when you hear crackling on a long-distance phone call).

continued...

Bell Canada Testing continued.

UTCS has cooperated with Bell Canada by giving them a list of phone lines that have experienced problems. In several instances, UTCS and Bell staff have visited the homes of users, to attempt recreating and measuring the problems that the users have reported. UTCS hopes to continue this cooperation, so that a solution to the disruption in dial-up service may be found.

UTCS would appreciate your help in solving this problem. Please call Jon Alexander at 978-6230 if you are having any trouble using your modem and the phone lines to connect to UTCS.

Using Relational Databases on the Macintosh

Dariusz Dabek
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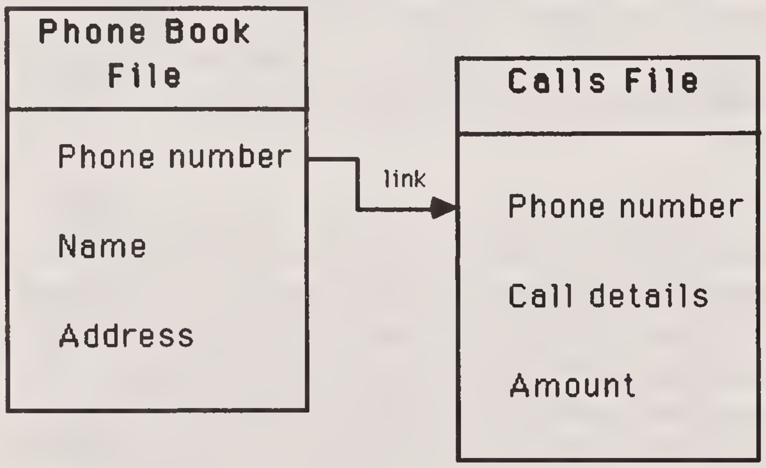
DABEK at UTORONTO

The simplicity of the graphics-based environment allowed the Macintosh computer a quick entry into the mainstream of data processing. Whether in word processing, spreadsheets, communications, or database management, Macintosh applications are inherently easy to use; because of this, they are favoured by first time and casual users.

This article deals with database management programs (DBM). DBM is a record-keeping system with a sophisticated indexing capability. Some common academic uses involve collection of data from ongoing experiments, tracking student performance, and bibliographic reference systems. To simplify, let us use a telephone book as an example. The information consists of names, addresses, and telephone numbers, with the names ordered alphabetically so that the required information can be found quickly and easily.

The DBM files contain fields and records; a **field** is a category of information, such as an address, and a **record** contains all the field information for a unique instance. A database can contain one or more files. Usually, each file has a different set of fields, but when some fields in different files are intentionally equal, we can create a **relational database**. The equal fields are called **linked** fields.

For example, the telephone company's database might contain a file of all calls made and a “phone book” file. The “calls file” contains the phone number, record of calls, and the charges per call. The “phone book” file includes phone numbers, names, and addresses. (See diagram below.)



If we assume that the phone number field is the linked field, we can retrieve from the calls file all calls for a given phone number and compute the amounts owed. A statement can now be mailed to a person whose address is found in the phone book file. The last function, the search for the address, is performed automatically, demonstrating the flexibility of the DBM program.

The two DBM programs generating most interest are Omnis 3 Plus and the 4th Dimension (4D). Both are re-

continued...

Relational Databases continued.

lational, offer a high degree of sophistication in data-handling abilities, and provide full control over the Macintosh environment. As you can see in *Table 1*, 4D seems to outperform Omnis 3 Plus, feature for feature. For comparison, we have also included dBASE III Plus, a popular DBM for MS-DOS based machines.

	4D	**Omnis 3 Plus**	**dBASE III Plus**
Files per database	99	24/12 linked	20
Fields per file	511	120	128
Subfiles per file	511	0	0
Fields per subfile	511	0	0
Nested Subfiles levels	5	0	0
Complete database	4GB	160MB	4GB
Bytes per record	4GB	25KB	4KB
Records per file	16 million	max file size	1 billion
Total indexes	32,767	12	7
Total links	no limit	12	1
Layouts per database	32,767	12	no limit
Layout size	12x12 ft	Mac screen	N/A
Total variables	32,767	65	256
Total procedures	32,767	99	no limit

KB = kilobyte MB = megabyte GB = gigabyte

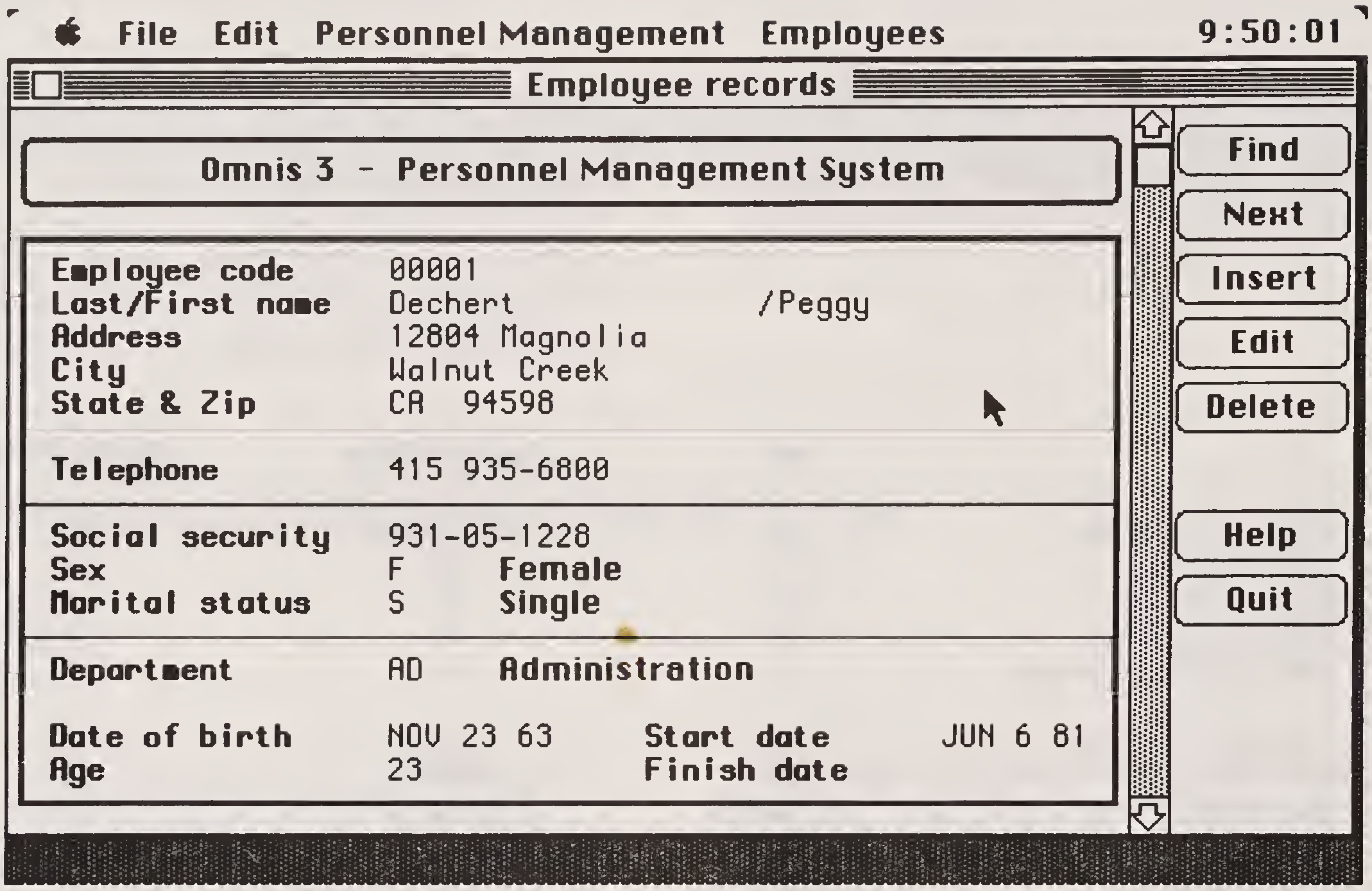
Table 1

Although the two programs are functionally equivalent, there is one fundamental difference between them. The 4th Dimension is not only a DBM but also a complete application generator. An **application generator** is a program that allows creation of other programs with a significant reduction of programming effort. 4D provides complete control over communication ports, all menus except Apple and Edit, and externally written routines. Additionally, 4D exploits the Mac look and feel to a much greater extent than Omnis. For example, it is possible to manipulate graphics as fields in a record, or as background pictures in the layouts. *Figures 1* and *2* give examples of screens from both Omnis and 4D. Even though the applications are the same, the visual effects are very different.

The 4th Dimension is not a perfect program, however. Omnis 3 Plus tends to be at least two to three times faster for most sort and insert operations. Moreover, the multiuser versions of Omnis are compatible with all of the existing Macintosh networking software, but 4D runs under only one, AppleShare. You can buy Omnis as a single user application and later upgrade to multiuser; 4D is available only with multiuser option and hence is initially more expensive. Support for Omnis is more extensive, at this point, and includes special seminars and training courses; similar courses for 4D are not available at the moment. Finally, the hardware required to run the programs differs greatly. Omnis can run on a system with 512KB of memory and two floppies, but 4D requires at least 1MB of RAM on a Macintosh Plus, and a hard disk is *highly recommended.*

continued...

Relational Databases continued.



Employee code 00001
Last/First name Dechert /Peggy
Address 12804 Magnolia
City Walnut Creek
State & Zip CA 94598

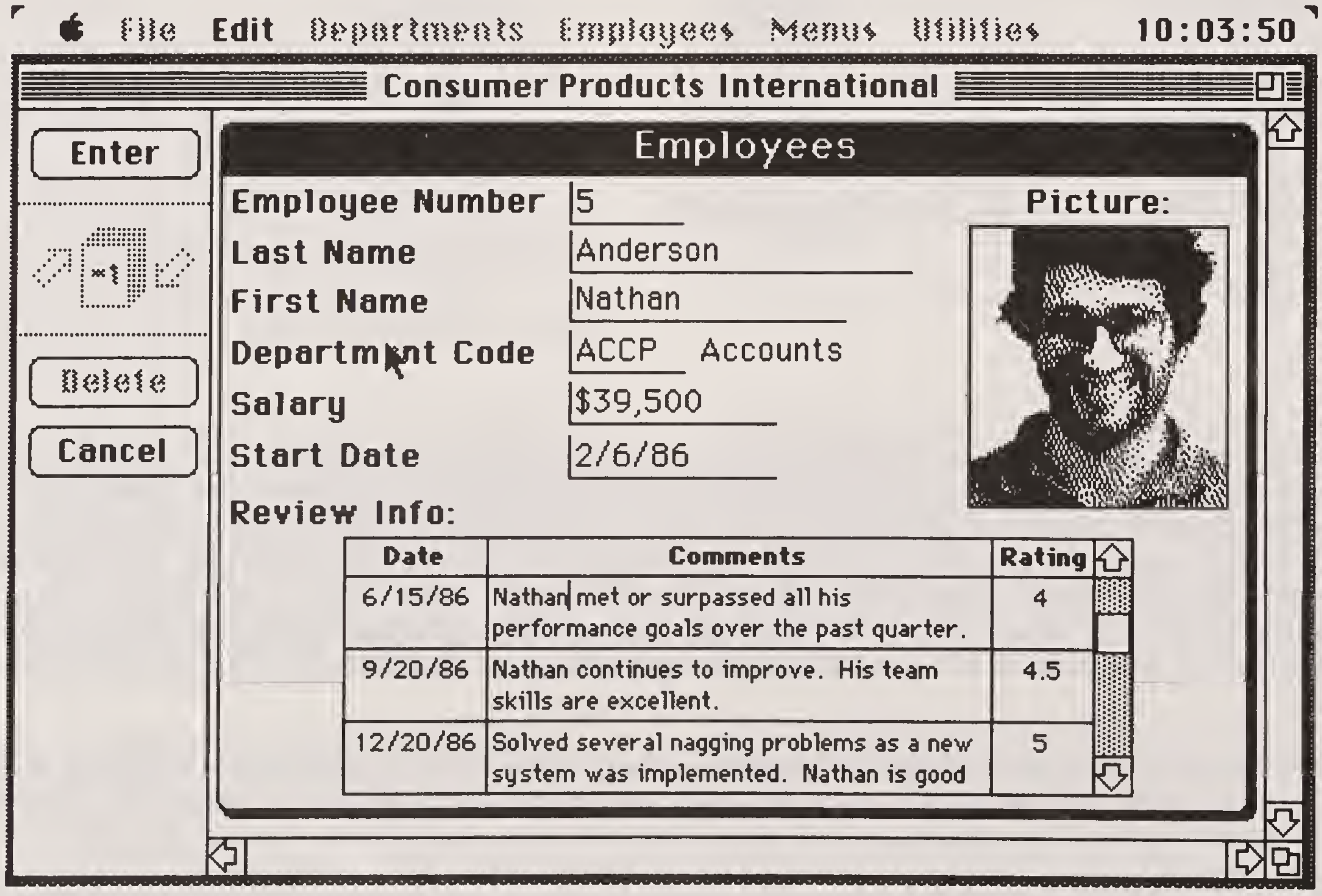
Telephone 415 935-6800

Social security 931-05-1228
Sex F Female
Marital status S Single

Department AD Administration

Date of birth NOV 23 63 Start date JUN 6 81
Age 23 Finish date

Figure 1. Sample Omnis 3 Plus Screen.



Employee Number 5
Last Name Anderson
First Name Nathan
Department Code ACCP Accounts
Salary $39,500
Start Date 2/6/86

Review Info:

Date	Comments	Rating
6/15/86	Nathan met or surpassed all his performance goals over the past quarter.	4
9/20/86	Nathan continues to improve. His team skills are excellent.	4.5
12/20/86	Solved several nagging problems as a new system was implemented. Nathan is good	5

Figure 2. Entry layout generated by 4D.

continued...

Relational Databases continued.

In conclusion, I would like to stress that either program is viable for serious database work. The final decision is a function of all of the options mentioned above. Some people may prefer 4D because it follows closely the Macintosh environment guidelines or because of its greater flexibility. Others may prefer the speed or lower cost of Omnis 3 Plus.

Red Ryder 10.0 Now Available.

Warren Bell
wbell@gpu.utcs.toronto.edu
WBELL at UTORONTO

[*Note: One of our Advising staff, Warren Bell, has purchased an early copy of Red Ryder 10.0. This article is based on his initial experiences with the product.*]

Version 10.0 of the popular Macintosh communications program, Red Ryder, is now available. It adds many features not found in the earlier versions and includes a 150-page spiral-bound, laser-printed manual, written by the author, Scott Watson.

Previously distributed as "shareware," it has now become a commercial product, selling for US$80 (US$85 outside of the US and Canada). Registered owners of the previous (shareware) versions may upgrade to Version 10.0 for US$20 (US$25 outside the US and Canada) by sending in their original master disk with payment for the upgrade.

FileTransfer:

Red Ryder now supports YMODEM-batch, an extension to the XMODEM protocol, which allows you to send or receive several files at once. Previously, you had to wait for each file to finish before starting the next file. Not all systems support the YMODEM-batch file transfer protocol; the UTCS Micro Lab Bulletin Board System (which uses the Fido BBS system) supports YMODEM-batch, as does the ProComm communications program for IBM PCs and compatibles.

Red Ryder also supports a 1 kilobyte (KB) block size with XMODEM or YMODEM-batch file transfers. This reflects a modification of the XMODEM (and YMODEM) file-transfer protocol, which now uses a 1KB block size instead of XMODEM's original 128-byte block size. The speed of a file transfer on a *clean* line may thus be improved, since less overall time is spent determining whether the blocks sent are good. Speed may be worse on noisy lines, however, since the blocks to be resent are larger (the 128-byte block size is still available).

The status display window is now a real window rather than a region at the top of the screen; the window is movable, so it doesn't block the screen. In previous versions, clicking the mouse during a file transfer would cancel the transfer. Now, you must click the mouse in the close box of the status window if you want to cancel a file transfer. This reduces the chance of accidentally cancelling a file transfer in progress. A larger file-transfer status bar now shows the percentage transferred.

The status window also indicates what name will be given to a file received in "MacBinary" format. The approximate time remaining is now displayed in minutes and seconds; in previous versions, only minutes were shown.

Save Terminal Settings:

Red Ryder now allows you to save a number of "settings files" containing options you have chosen in the program's menus. This means you can quickly change the terminal settings (such as baud rate, parity, tabs, terminal emulation, keyboard mappings) in order to use different services requiring different options.

New "Phonebook" Facility:

The new version of Red Ryder introduces a "Phonebook" facility, through which you can keep lists of the

continued...

Red Ryder continued.

systems you call frequently. Phonebook stores the system name, the dialing command, and, optionally, a settings file and a procedure file for each number. You may also password-protect your Phonebook.

VT100 Keypad Definitions:

Distributed with Version 10.0 is a separate program called "Install Keypad," which allows you to redefine any key combination on your keyboard to send one of the special VT100 key sequences. First, you must save a settings file from within Red Ryder: when you run the keyboard redefinition program, it asks you to select a settings file. It then displays a window with an outline of the VT100 keypad, the cursor arrow keys, and the Escape and Linefeed keys. You select the VT100 key you would like to define, and the program asks you to type the desired key combination on your keyboard (or click on the Cancel button to cancel the definition for that key). The key combination you typed will be stored in the settings file; whenever you use that settings file, Red Ryder will transmit the characters corresponding to the VT100 key that you chose. This facility allows Red Ryder to support the special VT100 keys on the full range of keyboards available for the different Macintosh computers, including third-party keyboards for the Mac SE and the Mac II, without having to know the layout of these keyboards ahead of time.

Charges Estimate:

The clock now displays the approximate connect-time charge, based on a cost that you specify with the "Set Billing Cost" option in the "Service" menu. The cost is entered in hundredths of cents per minute.

Setting the Font:

The "Set Font" command in the "Local" menu allows you to set the font and point size in which the text is displayed. When in Red Ryder's TTY mode, you may use any installed font or point size; while in VT100 or VT52 mode, you may use only the "TTY-VT100-VT52" font, but you may choose 9 or 12 point size.

Changes to the Procedure Language:

There are a number of changes to Red Ryder's procedure language, as well as the addition of a number of commands, but I have not had the opportunity to investigate these. Apparently some procedures written for older versions of Red Ryder may not work with the new version.

A Few Problems:

If Red Ryder receives a valid VT100 Escape sequence that it doesn't support, it will display part of the sequence, rather than suppress it. This may confuse some systems that require a completely accurate VT100 terminal.

The Phonebook graphics are "cute," but they are also awkward and slow. They are based on the desktop telephone indexes that have a "flip-open" cover and a sliding tab that selects the letter of the alphabet. Unfortunately, the Phonebook's "tab" is hard to select quickly with the mouse, and each time you move to a different section of the alphabet, the "cover" closes. You must then select the "Open" button and wait while the program draws the cover "opening." This can be annoying, especially if you use a large number of systems in one session. Finally, Phonebook entries can not be reordered; they remain in the order of entry.

The "Save Settings" command doesn't save tab stops unless you change the tab settings *in the current session*. If you do not change the tab settings before you save a settings file, you will get the default tab settings when you use the file. The default tab settings seem incorrect.

Screen updating is a bit slow. However, this is only noticeable when you use a desk accessory or a setting window that covers up a portion of the screen. In that case, Red Ryder has to redraw all the text in the terminal window.

The Kermit file-transfer protocol works, but Red Ryder does not support acting or communicating with another Kermit in "server" mode. Neither does it give you full control over the settings of a Kermit file transfer.

Summary

Overall, this program is quite powerful, useful, and inexpensive compared to other commercial terminal-emulation packages for the Macintosh. The problems mentioned above are not serious, and they may be rectified in the next release. There is plenty of discussion (which the program's author reads and responds to) in the Red Ryder support group on the GEnie bulletin board, and a "10.1 patch" has already been mentioned.

The Help Key

[The Help Key is an occasional feature prepared by Information Centre staff. If you have a question on some aspect of information technology, you are welcome to submit it to the Editor, at the address on the inside cover, or to SYSOP on the UTCS Bulletin Board System (be sure to mention that your question is for The Help Key).]

The SAS statistical package is the subject of a number of questions for this edition of The Help Key.

Q: My problem is with the CMS FILEDEF command in SAS. I submit the following statement from the SAS display manager:

```
cms filedef mysource disk file1 sas a;
```

Then I try to include the contents of FILE1 SAS A in the program window with the command: INCLUDE MYSOURCE. SAS sometimes replies ERROR CODE '03' ON 'MYSOURCE' or ERROR CODE '06' ON 'MYSOURCE'. The lines of my program are recorded nowhere in the log. What is wrong?

A: The problem does not occur within the FILEDEF command. These errors occur when SAS is not happy with the form of the source file. Check to see that the Record Format of FILE1 SAS is *fixed* and that the Logical Record Length is *80*. These parameters can be properly set on the command line from within XEDIT:

```
         recfm f
and/or
         lrecl 80
```

Note that an attempt to run this SAS program noninteractively using the CMS command SAS FILE1 will also produce one of these error messages unless FILE1 SAS A has RECFM=F and LRECL=80.

Q: Is there a way to obtain a hardcopy of the contents of a SAS/PC window?

A: This can be done in two ways. Many people are probably familiar with the first: simply use FILE from the command line within any window to store the window contents in a DOS file. This file may then be edited in the program editor if desired, and/or printed as any DOS file might be. A second way of printing a window

```
file 'prn:'
```

from the relevant window's command line. Although this method is more direct, it precludes any editing possibilities.

Q: I have a SAS library with several SAS datasets on the MVS system. How do I transfer the entire library to CMS?

A: First, be sure you know the full name of the MVS file containing the SAS dataset library (e.g., TS01234.SASDAT if you use TSO or U01234.SASDAT if you use WYLBUR). You also need a valid GPJS SAC and password. Then log on to CMS and issue the following command (on one line):

```
getutca ts01234.sasdat (sac 3456 password abcd
 type sas lines 5000
```

(where *3456* is your SAC number and *abcd* is your MVS password). If your SAS dataset is large, you may have to increase the value of the LINES option. The default value of 5000 is enough to transfer approximately 25 tracks.

This command submits a job to MVS. When the job is complete, two files appear in your Reader List. One file is the log of the job (relevant only if the job has not run successfully); the second is the SAS dataset library in a special "tape format." Both will have a filename identical to your user ID and a filetype identified as OUTPUT. However, the class, which is defined in the third column of your Reader List, will be PRT for the first file and PUN for the second file.

Now, receive the second file onto your A disk. The name of this file will be DDNAME TAPE A. Convert this

continued...

The Help Key continued.

library into a standard CMS SAS library, where each member is a separate CMS file. To do this, first issue the following FILEDEF:

```
filedef tape disk ddname tape a
```

and then process the following statement with the current SAS:

proc copy in=tape out=*mylib*;

Mylib is the name you have chosen for the library. A number of files will be created on your A disk with filetype MYLIB and filenames corresponding to datasets in your original SAS library. The file DDNAME TAPE A can now be deleted.

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WordPerfect Pitch/Font Settings for Laser Printing

Patricia Hood
PHOOD at UTORONTO

In the August issue of *ComputerNews,* instructions were given for preparing documents destined to print on an Apple LaserWriter. Two users expressed concern about the pitch values given for the various fonts — this article is an attempt to clarify which pitches you should use.

The pitch values for the LaserWriter fonts given in WordPerfect's PRHELP program are the best values to use in most cases. There are, however, documents or portions of documents that look better when a higher or lower pitch setting is substituted. Experimentation is the only way to get the look you want; the examples below illustrate the process.

contined...

WordPerfect Pitch/Font Settings continued.

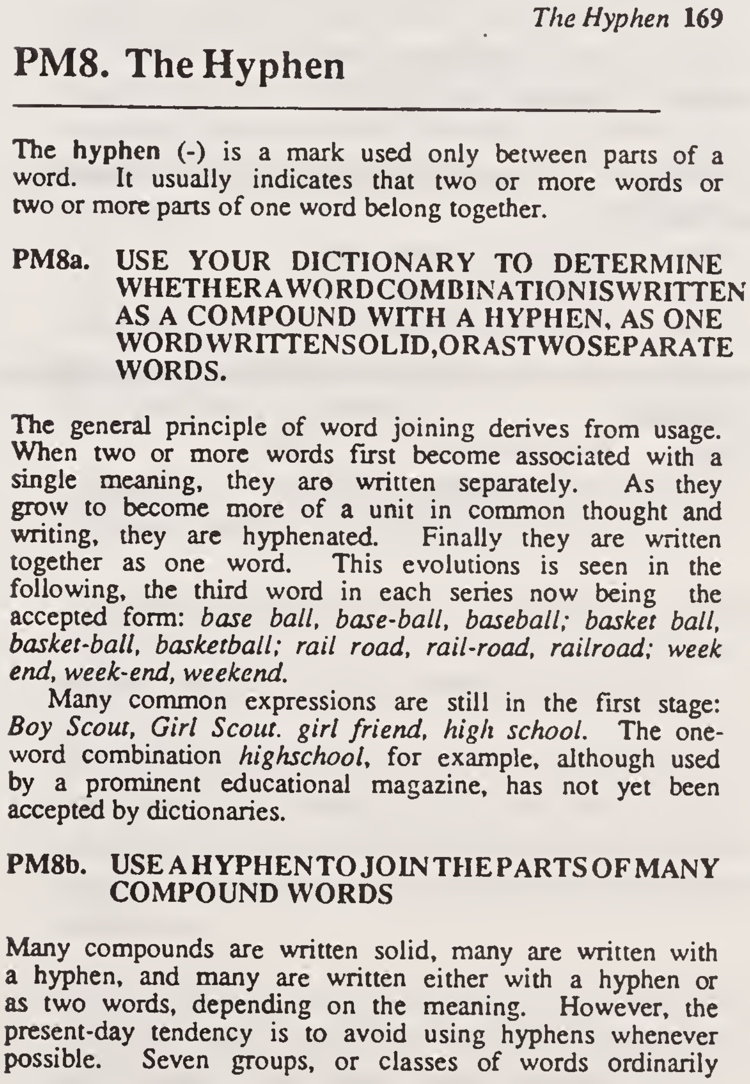
Example 1 shows a reproduction (using WordPerfect) of page 169 of the McGraw-Hill *Handbook of English*. The default pitch of 13* is used for the entire document. The first obvious problem with this page is the spacing between words in the rules PM8a and PM8b. WordPerfect's default pitch setting does not accommodate bold upper-case characters, nor does it allow for the longer length of upper-case text (compared with mixed-cased text). To solve the word-spacing problem for this text, the pitch setting must be reduced from 13* to 11* before the output is acceptable. Example 2 shows the results of the revised pitch. (Please note that a change in pitch also requires a change of margins.)

The second problem with the text in Example 1 is the opposite of the first: The words in the body text are too far apart for some purposes, such as book publishing. The solution is similar, however. To reduce the size of the spaces between words, you carefully increase the pitch until the words are close enough but not too close. (The margins must be revised as well.) Example 2 shows how the body text looks using pitch 14*.

There is no perfect solution!

While you can selectively increase or decrease the pitch for a passage of text, you will not be able to avoid all the word-spacing problems that occur within a document. WordPerfect does not understand a minimum or maximum acceptable word space and is not designed to apply such a concept. If you require "publishing standard" output, you should use a word-processing or desktop-publishing package capable of producing that quality of output.

* Note: The examples below have been photoreduced to fit into available space.



The Hyphen **169**

PM8. The Hyphen

The **hyphen** (-) is a mark used only between parts of a word. It usually indicates that two or more words or two or more parts of one word belong together.

PM8a. USE YOUR DICTIONARY TO DETERMINE WHETHERAWORDCOMBINATIONISWRITTEN AS A COMPOUND WITH A HYPHEN, AS ONE WORDWRITTENSOLID,ORASTWOSEPARATE WORDS.

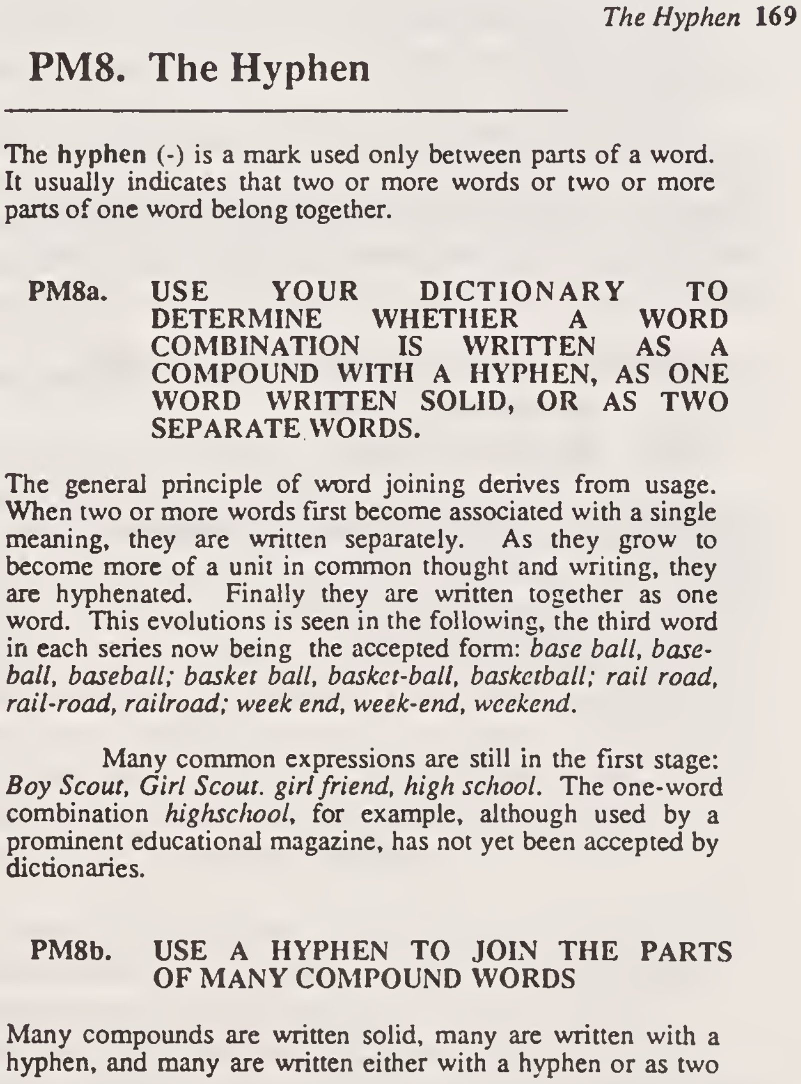
The general principle of word joining derives from usage. When two or more words first become associated with a single meaning, they are written separately. As they grow to become more of a unit in common thought and writing, they are hyphenated. Finally they are written together as one word. This evolutions is seen in the following, the third word in each series now being the accepted form: *base ball, base-ball, baseball; basket ball, basket-ball, basketball; rail road, rail-road, railroad; week end, week-end, weekend.*

Many common expressions are still in the first stage: *Boy Scout, Girl Scout. girl friend, high school.* The one-word combination *highschool*, for example, although used by a prominent educational magazine, has not yet been accepted by dictionaries.

PM8b. USEAHYPHENTOJOINTHEPARTSOFMANY COMPOUND WORDS

Many compounds are written solid, many are written with a hyphen, and many are written either with a hyphen or as two words, depending on the meaning. However, the present-day tendency is to avoid using hyphens whenever possible. Seven groups, or classes of words ordinarily

Example 1: *A default pitch of 13* used throughout the document*



The Hyphen **169**

PM8. The Hyphen

The **hyphen** (-) is a mark used only between parts of a word. It usually indicates that two or more words or two or more parts of one word belong together.

PM8a. USE YOUR DICTIONARY TO DETERMINE WHETHER A WORD COMBINATION IS WRITTEN AS A COMPOUND WITH A HYPHEN, AS ONE WORD WRITTEN SOLID, OR AS TWO SEPARATE WORDS.

The general principle of word joining derives from usage. When two or more words first become associated with a single meaning, they are written separately. As they grow to become more of a unit in common thought and writing, they are hyphenated. Finally they are written together as one word. This evolutions is seen in the following, the third word in each series now being the accepted form: *base ball, base-ball, baseball; basket ball, basket-ball, basketball; rail road, rail-road, railroad; week end, week-end, weekend.*

Many common expressions are still in the first stage: *Boy Scout, Girl Scout. girl friend, high school.* The one-word combination *highschool*, for example, although used by a prominent educational magazine, has not yet been accepted by dictionaries.

PM8b. USE A HYPHEN TO JOIN THE PARTS OF MANY COMPOUND WORDS

Many compounds are written solid, many are written with a hyphen, and many are written either with a hyphen or as two

Example 2: *Pitch is reduced from 13* to 11* for bold upper-case text and increased to 14* for regular paragraph text.*

UTCS Microcomputer Courses

Irene Rosiecki
ROSIECKI at UTORONTO

During this past summer, UTCS staff have been busy developing new microcomputer courses for both the IBM PC and compatibles and the Macintosh computers. We are happy to anounce that introductory courses in Lotus 1-2-3, dBASE III Plus, and Desktop Publishing are now being offered and are already scheduled into the new year. Apart from the Desktop Publishing course, all courses at UTCS are hands-on, providing each student with practise on a microcomputer during the course.

Class size is kept to a minimum, allowing for more student-teacher interaction. Registration is handled on a first-come, first-served basis. UTCS courses are usually offered on an ongoing basis every 4-6 weeks.

For a complete list of UTCS Microcomputer Courses, and to find out about course fees, please contact the:

UTCS Education Office
4 Bancroft Avenue
Room 217
Phone: 978-4565

Listed below are our course offerings for November and December where space in the class is still available:

CONIBM101 - Microcomputer Concepts (IBM)
Date: November 20, 1987
Time: 9:00 - 12:00 noon

CONMAC101 - Microcomputer Concepts (Macintosh)
Date: November 18, 1987
Time: 9:00 -12:00 noon

dBASE101 - Introduction to dBASE III Plus
Date: November 30 - December 4, 1987
Time: 12:00 - 2:00 p.m.

DSKTOP101 - Introduction to Desktop Publishing
Date: November 17, 1987
Time: 9:00 - 1:00 p.m.

MSWORD101 - Introduction to the Macintosh and Microsoft Word
Date: November 30 - December 4, 1987
Time: 1:00 - 5:00 p.m. (Nov. 30)
1:00 - 4:00 p.m. (Dec. 1 - 4)

SASPC101 - Introduction to SAS on the IBM PC
Date: November 23 - 27, 1987
Time: 11:00 - 1:00 p.m.

Date: December 7-11, 1987
Time: 11:00 - 1:00 p.m.

SASPC201 - Intermediate Applications of SAS on the IBM PC
Date: November 9-13, 1987
Time: 11:00 - 1:00 p.m.

WRDPERF101 - Introduction to WordPerfect for the Academic
Date: December 14 -18, 1987
Time: 9:00 - 12:00 noon

New Edition of IMSL - Edition 10.0 on MVS and VM/CMS

Andrzej J. Pindor
APINDOR at UTORONTO

The newest release of the IMSL library, Edition 10.0, will become available for user testing under MVS and VM/CMS on November 1, 1987. Highlights of the new release are described below.

In a major revision, the IMSL library has evolved into three separate but coordinated libraries that allow easier user access. These libraries, MATH/LIBRARY, STAT/LIBRARY, and SFUN/LIBRARY, contain essentially all of the abilities of the former IMSL library (Edition 9), plus many more. Together, the three libraries contain approximately 800 user-callable subprograms and provide more than 150 new areas of functionality. Features of the update include the following:

- A new subprogram naming convention has been introduced. Designed to make routine names more descriptive and mnemonic, it also conforms to widely accepted FORTRAN naming conventions. The single- and double-precision versions of routines now have different names; this eliminates any confusion over which version was linked and allows you to use both versions in the same program.
- Basic Linear Algebra Subprograms (BLAS), carefully coded to enhance speed and accuracy, have been extensively used in the implementation of vector/matrix operations.
- Substantial enhancements have been made to facilitate unobtrusive error handling.
- The introduction of automatic workspace allocation means you need no longer calculate workspace requirements or allocate workspace variables.
- IMSL documentation has also been improved in both form and content. Layout and print quality have improved, making the manuals much easier to read. Descriptions of algorithms are also more satisfactory.
- MATH/LIBRARY features major enhancements in the areas of numerical mathematics, particularly in optimization, quadrature, linear systems, and interpolation.
- STAT/LIBRARY subprograms have been revised to allow the printing of results and the specification of weights and frequencies. These subprograms handle missing values efficiently and reflect numerous advances in algorithms.
- Version 2.0 of SFUN/LIBRARY, provided with this update, now includes all of the special-functions routines from Edition 1.0 of SFUN/LIBRARY, as well as the capabilities previously available in Chapter M of the Edition 9.2 IMSL Library.

This update incorporates modern FORTRAN programming techniques possible only under the ANSI FORTRAN 77 standard.

IMSL is going to continue support for Edition 9.2 until 1989, but you are strongly encouraged to convert your programs to Edition 10.0 to benefit from the newer algorithms. Although the new routines are generally easier to use than those in Edition 9.2, certain changes may be necessary in your programs. For example, while many Edition 9.2 routines required that symmetric matrices be packed into a single-dimension FORTRAN array, the new library routines use symmetric matrices stored as two-dimensional arrays. New programs will be easier to write, but old programs should eventually be modified to work with symmetric matrices in the simpler form.

To simplify the transition to the new libraries, IMSL provides a library of interface programs, the Library Interface. Calls to Edition 9.2 Library routines may be linked automatically, using the Library Interface, with appropriate routines from the new IMSL Libraries. The Library Interface routines have the same names and argument lists as the Edition 9.2 routines but will call the corresponding new library routine(s) to perform the calculations. Source code of the Library Interface routines is available to help you find the changes required by a new library routine.

In many cases the Library Interface returns the same results as the old routines. When it cannot, suitable warning messages are issued. For example, the Edition 9.2 routine EIGCC returns eigenvectors and eigenvalues in random order, whereas the new routines

continued...

New Edition of IMSL continued.

order them by the magnitude of the eigenvalue. If this affects your program, then it is probably worth converting to Edition 10.0 completely. There are other situations where the differences between an Edition 9.2 routine and the new library cannot be resolved by the Library Interface. In this case, messages will be issued to assist you in converting your program to the new library.

The following JCL will compile, load, and run a FORTRAN program on the MVS system, using the new IMSL library. Note that the name of the library has changed because both single- and double-precision routines are now stored in the same library.

```
//IMSL10  JOB (job statement)
// EXEC FORTGO,IX=APPL,LIBRARY='MATH.IMSL.LIB'
//FORT.SYSIN DD *
     .
     . source program goes here
     .
     .
/*
```

Here is an example showing JCL necessary to use new library routine(s), through the Library Interface, from a program calling the Edition 9.2 routine UGETIO:

```
//IMSLJOB JOB (job statement)
// EXEC FORTGO,IX=APPL,LIBRARY='MATH.IMSL.SPIF',
//          IX2=APPL,LIB2='MATH.IMSL.LIB'
//FORT.SYSIN DD *
     CALL UGETIO(1,NIN,NOUT)
     WRITE(NOUT,* 'NEW LIBRARY ACCESSED.'
     STOP
     END
/*
```

The first set of parameters on the EXEC statement determines which interface library will be used (single precision in this case). To use the interface between IMSL 9.2 double precision and IMSL 10.0, use LIBRARY='MATH.IMSL.DPIF' in the above JCL.

On the CMS system, first issue the GETME command:

getme imsl new

and then issue

help cms

to get the detailed syntax for the required GLOBAL TXTLIB and GLOBAL LOADLIB commands. As with MVS, you may use Edition 10.0 by itself or run either single- or double-precision Edition 9.2 routines through the Library Interface.

The manuals for Edition 10.0, as well as a more detailed description of the changes from Edition 9.2 to 10.0, are available in the UTCS Information Office (Room 201, 4 Bancroft Avenue).

In case of any problems or questions, or if you need help in converting your programs to the new edition, call 978-HELP.

UTCS Month-end to Match the University's

Ron Vander Kraats
RVK at UTORONTO

UTCS currently closes off its financial month at the end of each calendar month, while the University's accounting period ends on the 28th. To make everyone's bookkeeping easier, we have decided to synchronize with the University accounting system. Starting with the November month-end, therefore, the UTCS month-end will occur on approximately the 25th of each month so that we can prepare our billing tape in time for the Comptroller's deadline.

Under this system, the monthly customer activity report will reflect usage from the 26th of the preceding month through the 25th of the statement month. For example, the October report would detail charges from September 26th through October 25th, and these charges would appear in the October UNIFACTS statement. UTCS charges incurred between the 25th and the end of the month would appear in the UNIFACTS statement for November.

This change in month-end means that the last date for charges to be applied for the fiscal year would be approximately the 25th of April. Usage occurring after the 25th of April will be charged against the following fiscal year.

Waterloo C Upgrade

Herb Kugel
HERB at UTORONTO

A major upgrade of the University of Waterloo's C compiler for VM/CMS will be released shortly. This compiler, Version 3.0, features many enhancements, including complete ANSI standards and a fullscreen debugger.

UTCS will make this compiler available on both the UTORONTO and UTOREPAS machines as soon as possible. Please watch the logon messages for details.

Change Committee

Beverly Scarborough
BEVS at UTORONTO

Changes to Academic MVS Machine Services

1. Rates for printing services were increased (August 1).
2. Accounting was installed for typesetting use on the Linotronic 100 and 8700 laser printer from the MVS system (July 13).
3. University of Waterloo Pascal was removed (August 10).
4. BMDP '87 was put into user test (August 17).
5. Consolidation of IBM and BICS-PC printing via the MicroVAX was completed (September 4).
6. SPSS^x 2.2 was made production, and SPSS^x 2.1 was removed permanently (September 2).
7. SAS 5.16 was made production, and SAS 82.4 was made “OLD” for six months (September 2).
8. BMDP '85 was made production, and BMDP '83 was removed from service (September 2).

Changes to Academic VM/CMS Machine Services

1. VMSECURE rules for system use were introduced (July 21).
2. CMS was upgraded to Release 4 (August 16).
3. Minitab 5.1 was made production (September 2).
4. SPSS^X 2.2 was made production (September 2).
5. SAS 5.16 was made production, and SAS 82.3 was made “OLD” for six months (September 2).
6. BMDP '85 was made production, and BMDP '83 was made “OLD” status for six months (September 2).
7. VM/CMS accounting services provided expiry dates on Userids (August 26).

Personnel Changes

Christine Gray has joined Internal Systems in Accounting.

Rosi Tseu has joined Communications and Technical Support as Communications Assistant.

Documents at UTCS

All vendor-produced documentation may be ordered through the UTCS Information Office, Room 206, Engineering Annex. UTCS documents and selected vendor documents are also stocked there for purchase. For more information on prices, call Dale Wright at 978-4990. Whenever feasible, documents are made available online, and users are encouraged to print their own copies. On the MVS and VM machines, special commands have been provided for this purpose.

To print online documents on:

IBM MVS
WYLBUR users type "do document?"
TSO users type "help document"
APL users type ")LOAD 1 UTCSGUIDE<RETURN>HELP"

IBM VM/CMS
Type "help document"

GP UNIX
Use *ipr* command

In these examples, the document to be printed is the UTCS Guide to Census Tapes (MANUAL/LISTING=CENSUS).
<RETURN> means RETURN or ENTER key.

TSO:	document census forms(yxle) <RETURN>
WYLBUR:	do document <RETURN> and respond to the prompts.
CMS:	document <RETURN> <RETURN> laser census listing (forms yxle <RETURN>
GP UNIX:	nohup ipr -8p -fyxle /usr/doc/utcs/census & <RETURN>

UTCS Documents in hardcopy:

New:

Previously announced:

- Academic's Guide to Microcomputer Systems
- Character Sets for Highspeed Printing
- UTCS GUIDE TO PRODUCTS AND SERVICES: Introduction
- UTCS GUIDE TO PRODUCTS AND SERVICES: Basics
- UTCS GUIDE TO PRODUCTS AND SERVICES: Accounting
- UTCS Catalogue: Access, Part 1
- UTCS Catalogue: Access, Part 2
- UTCS Catalogue: IBM MVS Utilities
- UTCS Catalogue: Numerical Products
- UTCS Catalogue: Statistics Products
- UTCS Catalogue: Text Products
- UTCS Guide to Census Tapes
- UTCS Guide to Tape Usage on VM/CMS
- UTCS Guide to Kermit
- UTCS Guide to Micro File Transfer Service
- UTCS Guide to Text Processing on GP UNIX

UTCS Documents online	**MVS MANUAL**	**CMS LISTING**	**GP UNIX**	**Forms Code**
New:				
Previously announced:				
UTCS GUIDE TO PRODUCTS AND SERVICES: Introduction	INTRO	INTRO	/usr/doc/utcs/intro	*
UTCS GUIDE TO PRODUCTS AND SERVICES: Basics	BASICS	BASICS	/usr/doc/utcs/basics	*
UTCS Catalogue: Access, Part 1	ACCESS1	ACCESS1	/usr/doc/utcs/access1	*
UTCS Catalogue: Access, Part 2	ACCESS2		/usr/doc/utcs/access2	*
UTCS Catalogue: IBM MVS Utilities	MVSUTIL	MVSUTIL		*
Product-Function List	UTILLIST	UTILLIST		BXQD
UTCS Catalogue: Numerical Products	NUMCAT	NUMCAT		*
Product-Function List	NUMLIST	NUMLIST		BXQD
UTCS Catalogue: Statistics Products	STATCAT	STATCAT		*
Product-Function List	STATLIST	STATLIST		BXQD
UTCS Catalogue: Text Products	TEXTCAT	TEXTCAT	/usr/doc/utcs/textcat	*
UTCS Guide to BMDP	BMDP	BMDP		*
UTCS Guide to Census Tapes	CENSUS	CENSUS	/usr/doc/utcs/census	*
UTCS Guide to GP UNIX			/usr/doc/utcs/gpunix	*
UTCS Guide to GPJS	GPJSX	GPJSX	/usr/doc/utcs/gpjs	*
UTCS Guide to Highspeed Printing	PRINT	PRINT	/usr/doc/utcs/print	*

* *Recommended forms code for the 8700 is YXLE unless otherwise stated.*
† *Use the 87set command. Type "help 87set".*

Documents continued

UTCS Documents online	MVS MANUAL	CMS LISTING	GP UNIX	Forms Code
New:				
Previously announced:				
UTCS Guide to IBM MVS Online Storage	IBMDISK	IBMDISK		*
UTCS Guide to Kermit	KERMIT	KERMIT	/usr/doc/utcs/kermit	*
UTCS Guide to Micro File Transfer Service	MICROXFR	MICROXFR		*
UTCS Guide to Micro Laser Printing	MICRLASR	MICRLASR		*
UTCS Guide to SAS	SAS	SAS		*
UTCS Guide to SCRIBE		SCRIBE		*
(For printing instructions, see page 1 of document)				
UTCS Guide to Series/1 Terminal Use	SERIES	SERIES		*
3270 Emulation:				
Cybernex APL100 and Volker Craig VC404	CYBER	CYBER		*
DM1520	DM1520	DM1520		*
Hardcopy Terminal	HARDCOPY	HARDCOPY		*
IBM 3101	IBM3101	IBM3101		*
IBM PC Kermit	PCKERMIT	PCKERMIT		*
SOROC IQ	SOROC	SOROC		*
VT52	VT52	VT52		*
VT100	VT100	VT100		*
UTCS Guide to SPSS	SPSS	SPSS		*
UTCS Guide to SUBUTILS	SUBUTILS	SUBUTILS		*
UTCS Guide to Tape Usage on VM/CMS		CMSTAPE		*
UTCS Guide to Text Processing on GP UNIX			/usr/doc/utcs/text	*
UTCS Guide to TFW.MAK in SCRIBE		TFWMAK		*
UTCS Guide to TSO	TSOGD			*
UTCS Guide to UTDSUTIL	UTDSUTIL	UTDSUTIL		*
UTCS Guide to VM/CMS	CMSGD	CMSGD		*
UTCS Guide to WYLBUR	WYLINTRO			*
UTCS Rate Schedule (Commercial)		RATESCOM		†
UTCS Rate Schedule (External)		RATESEXT		†
UTCS Rate Schedule (Internal)		RATESINT		†
UTCS WYLBUR Tutorial	WYLTUTOR			*
Other Documentation online				
Kermit				
Kermit Protocol Manual	KERMITPM	KERMITPM		YXOE
Kermit User Guide	KERMITUG	KERMITUG		YXOF
ProComm				
ProComm Reference Manual	PROCOMM	PROCOMM		YXOE
VM Tape Documents				
TapeMap User's Guide and Reference		TAPEMAP		*
VMTAPE Messages and Codes		VMTMSGS		YXOE
VMTAPE User's Guide		VMTUSER		YXOE
VMSECURE				
VMSECURE User's Guide		VMSECURE		YXOE
Waterloo SCRIPT				
Reference Manual	WSCRPTRF	WSCRPTRF		YXLC
User's Guide	WSCRPTUG	WSCRPTUG		YXLC
Using SCRIPT in MVS/TSO	WSCRPTSO	WSCRPTSO		YXLC
Waterloo SCRIPT and a PostScript Printer	WSCRPTPST	WSCRPTPS		YXLC
Formula Processor Summary	WSCRPTFP	WSCRPTFP		YXLC
GML User's Guide	GMLUG	GMLUG		YXLC
GML Reference Summary	GMLRFSUM	GMLRFSUM		YXLC
OBS WYLBUR				
Messages and Codes	WYLMSGS			YXLD
Qwik Files	WYLQWIK			YXLD
Reference Summary	WYLREFCD			YXLG
Reference Manual	WYLREFMN			YXLD
7.0 Release Guide	WYLREL70			YXLC
User Guide	WYLUSER			YXLD
Electronic Mail				
A User's Guide to Electronic MAIL		MAILBOOK		YXOC

* *Recommended forms code for the 8700 is YXLE unless otherwise stated.*
† *Use the 87set command. Type "help 87set".*

Consulting and Enquiries

Applications Support & Advising Supervisor	Alex Nishri	KC308	978-7109
External Marketing Consultant	Ihor Prociuk	KC308	978-6875
Erindale College	Joe Lim	ER2035	828-5311
Information Office	Dale Wright	EA206	978-4990
Account & Access Code Enquiries (U of T)	Christine Gray	MP337	978-8703
Account & Access Code Enquiries (External)	Sylvia May	MP337	978-7148
IBM PC Maintenance	Kam Mark	SF4306	978-5050
Tape Library (Academic Services)	Rosa Esteireiro	MP368	978-7319
Tape Library (Administrative Services)	Miranda Fong	MP368	978-6693
Terminal Rentals	tba	SF4306	978-3787
U of T Computer Library	Stephanie Johnston	EA206	978-2987
UTCS Noncredit Short Courses	Irene Rosiecki	EA207	978-4565

Consulting & Advising Services:	978-HELP
CMS, TSO and GP UNIX userids:	ADVISOR
CMS Userid for mail problems:	POSTMSTR
System Status Enquiries (GP UNIX)	978-4318
System Status Enquiries (IBM)	978-7393
Interactive Services 300 (bps)	978-6200
Interactive Services 1200 (bps)	978-3959
Interactive Services 2400 (bps)	978-7239
Datapac	4320 0056
Telnet	0302043200056
Tymnet	<backspace>DPAC;302043200056

UTCS Directory

Director:	Dr. Warren Jackson	MP350	978-8948	WCJ at UTORONTO *
Associate Director:	Eugene Siciunas	MP350	978-5058	EUGENE at UTORONTO *
Managers:				
Communications &Technical Support	Norman Housley	SF4306	978-4967	NORMAN at UTORONTO *
Information Centre	Don Gibson	KC308	978-7331	DON at UTORONTO *
Internal Systems	Ron Vander Kraats	MP350	978-4428	RVK at UTORONTO *
OperationS	Dr. Bob Chambers	MP350	978-7092	
Systems	Bill Lauriston	MP331	978-3579	BILL at UTORONTO *

Committees on Computing

Committee on Administrative Computing	Chair	Janice Oliver	978-4322	
Research Board Standing Committee on Computing	Chair	Prof. C.C. Gotlieb	978-2986	
UTCS Board	Chair	Prof. D.M. Nowlan	978-4984	NOWLAN at UTORONTO *
Supercompter Users' Group at U of T	Chair	Prof. P.P. Kronberg	978-4971	

Legend
ER = Erindale
KC = Koffler Centre
MP = McLennan Physical Labs
SF = Sandford Fleming

* NetNorth/BITNET/EARN

UTCS Terminal and Advising Sites

Names and Locations

Central Advising Office (CAO), 978-HELP
Engineering Annex (EA, CDF), 11 King's College Road, Rooms 103, 107, 107B, 201, 203
Erindale College (Erin), 828-5339, Mississauga Road, Erindale Campus, Rooms 2005, 2039, 2045
Robarts, Robarts Library, 130 St. George St., Room 1061A
Sidney Smith (Sidney), 100 St. George St., Rooms 1071, 2105
St.Michael's College, 121 St. Joseph St., Room 107
Trinity College, 6 Hoskins Ave., Room 024
Victoria University, 73 Queens Park Cres.

Sites	**Hours of Access**				**Restrictions***	**Advising**
	Mon-Thurs	**Fri**	**Sat**	**Sun**		
CAO	10:00-18:00	10:00-18:00	closed	closed	Research	978-HELP
CDF	24 hrs	24 hrs	24 hrs	24 hrs	Undergrads	No
EA	24 hrs	24 hrs	24 hrs	24 hrs	None	978-HELP for Research
Erin (2039) □	9:00-17:00	9:00-17:00	12:00-16:00	12:00-16:00	Research	Rm 2005
(2045)	24 hrs	24 hrs	24 hrs	24 hrs	Undergrads	Rm 2005
(235)†	8:00-22:00	8:00-17:00	closed	closed	None	Rm 2046
Robarts	8:30-24:00	8:30-24:00	9:00-17:00	13:00-22:00	None	978-HELP for Research
Sidney	7:00-24:00	7:00-24:00	7:00-24:00	7:00-24:00	None	978-HELP for Research
St.Michael's	24 hrs	24 hrs	24 hrs	24 hrs	None	Arranged by College
Trinity	8:00-22:00	8:00-22:00	8:00-22:00	8:00-22:00	None	Arranged by College
Victoria	8:30-23:00	8:30-23:00	closed	closed	None	Arranged by College

Legend

* Research includes graduates, faculty, staff.
□ Key access available.
† Access restricted to building hours.

Advising Hours

CAO	Monday through Friday, 10:00 - 18:00
Erin	Monday through Friday, 09:00 - 20:00

Sites	**PACX**	**Network Terminal Server**	**CMS**	**Printers Terminals**	**CDF/PC**
CDF	N	N	N	Y	N
EA	N	Y	N	Y	N
Erin	Y	Y	N	Y	N
Robarts	Y	N	N	Y	Y
Sidney	N	Y	N	Y	Y
St.Michael's	Y	N	N	Y	Y
Trinity	N	N	Y	Y	Y
Victoria	Y	N	N	Y	Y

(Y=yes, N=no)

UTCS Services

UTCS Centrally Owned and Managed

Systems

IBM VM/CMS

- General Purpose Timesharing; access to NetNorth, BITNET, and EARN networks; access to CRAY X-MP
- 4381-R03 processor, 32 megabytes of memory
- CP operating system, VM/SP HPO R4.2
- CMS timesharing system, VM/SP Release 4
- RSCS spooling system, Release 3
- CRAY station Release 4

IBM MVS

- TSO, WYLBUR, APL, Batch
- runs as a preferred guest under VM
- MVS operating system
- Xerox 8700 Laser Printing

GP UNIX
Technical Assistance: 978-8853

- General Purpose Timesharing under SUN UNIX 3.2
- SUN 3/280, 8 megabytes of memory
- access to Linotronic typesetter
- offers a sophisticated and powerful environment for text processing
- offers a sophisticated programming environment suitable for commercial software development or testing
- full access to USENET, an electronic technical information exchange facility
- offers excellent electronic mail facilities and ability to send or receive mail from most computer networks worldwide, such as UUCPNET, ARPANET, NetNorth, BITNET, CSNET, CDNNET

Services

Communications & Technical Support
Primary Phones: 978-3787, 978-4967

- Communications Group provides communications systems, terminals, modems, data channels: consulting and installation.
- Field Service Group installs and maintains communications and computer systems, particularly IBM PCs and Micro Vaxes, on a contract basis or on a cost-per-call basis.
- provides consulting on computer systems technology and installs computer systems
- provides access between the IBM systems and machines using UNIX, VMS and other operating systems. Ethernet, Pronet, and IBM TRN technologies are used over various transmission media including optical fibre. More basic communications techniques are also used for moderate speed links.
- provides consulting on local area networking and installs LANS
- provides access to NetNorth (BITNET), the North American Universities Network; and USENET, the UNIX networking fraternity
- will provide a communications solution to department needs on a contractual basis

Information Centre
Primary Phone: 978-HELP

- Provides assistance in use of electronic messaging, including use of Local Area Networks (LANS); NetNorth/BITNET/EARN, the world Universities network; CDNNET, the Canadian X.400 network; ARPANET; CSNET; USENET; and other international connections.
- provides advising, consulting and documentation on:
  - command languages, including CMS, TSO, WYLBUR, JCL, and UNIX
  - high level languages, including FORTRAN, and PL/I
  - packages and libraries, including SAS, SPSS-X, BMDP, IMSL, and NAg
  - editors and formatters, including XEDIT, TSO, WYLBUR, ed, SCRIBE, nroff/troff
- provides general micro support
  - selection consulting for hardware and software
  - Micro Lab for evaluation of hardware and software
  - advice on University discounts
  - media conversion and data transfer
  - operates UTCS Microcomputer Bulletin Board System
  - offers Micro Laser Printing Service
  - offers 35mm slide production service using Polaroid Palette
  - administers Local Area Network of PCs for research use
- high quality typesetting
- installs and maintains application packages
- provides courses on the more popular services

The principal mandate of UTCS is to plan, implement, and operate facilites and "common-carrier" networks, and to plan and support divisional, departmental or project computer facilities as requested.

Facilities Managed by UTCS

Administrative Computing

- administrative IMS/VS, DB/DC, DB2, Batch, and TS0
- 4381-R03 processor, 32 megabytes of memory
- MVS operating system

Computer Disciplines Facility/VAX

VAX-11/780, 4 megabytes of memory
VAX-11/750, 4 megabytes of memory

- Computer Science interactive access
- UNIX (Berkeley UNIX 4.3BSD)

Computer Disciplines Facility/PC

- 97 TI Professional Computers connected in a Local Area Network
- introductory Computer Science instruction
- MS-DOS with Turing environment

Erindale College Systems

VAX 8200, 8 megabytes of memory
- instructional access using VMS
- research access

VAX-11/750, 5 megabytes of memory
- instructional access using UNIX (Berkeley UNIX 4.3BSD)

Institutional Relations System

VAX-11/750, 8 megabytes of memory
- database services to the owner departments using VMS

EPAS Facility

- 4361-5 processor, 16 megabytes of memory
- general VM/CMS services to the owner departments

Centre for Large Scale Computation (CLSC)

- Cray Research Inc. X-MP/22
- 2 processors, 2 megawords main memory
- solid state disk (SSD) with 16 megawords of storage
- COS 1.15 operating system
- VAX-11/750 + microVAX II providing VMS front-end services
- VM front-end services provided by UTCS 4381-P02

UTCS Software List

SOFTWARE LIST for MAINFRAME COMPUTERS MVS, VM/CMS, UNIX

Each programming language or package available at UTCS has a support level. In general, Class A Products receive full support, Class B limited support (as time and resources allow), Class C no active support.
For complete details of UTCS product support policy, see the UTCS GUIDE TO PRODUCTS AND SERVICES: Introduction.

Package/Compiler	System	Support	Version
Communications			
Kermit	VM/CMS	A	---
	UNIX	B	4C(058)
FTS	VM/CMS	A	---
MAIL/MAILBOOK	VM/CMS	A	86.359
MICROLASER	VM/CMS	A	---
macget/macput	UNIX	C	---
netcopy, netexec, to (NetNorth Tools)	UNIX	B	---
xmodem	UNIX	C	---
ftp,rsh,rlogin,telnet,rep *(Access via TCP/IP to most of the networked machines on all three campuses)*	UNIX	B	---
rn/Pnews	UNIX	B	---
mail,mh,Mail	UNIX	-	---
rje	UNIX	B	---
Graphics			
PLOTBASIC (FORTRAN)	MVS	A	---
	VM/CMS	C	---
PLOTBASIC EXTENDED ROUTINES	MVS	A	---
SAS/GRAPH	MVS	A	5.16
	VM/CMS	A	5.16
SURFACE II	MVS	C	---
Languages			
APL (Sharp)	MVS	C	May 83
ALGOLW (Stanford)	MVS	C	n/a
ASSEMBLER(F)	MVS	C	2.1
	VM/CMS	C	---
A.A.E.C. PASCAL	MVS	C	2.0
Concurrent Euclid	VM/CMS	C	1.9
FORTRAN H EXT.	MVS	B	2.2.1
FORTUTILS	VM/CMS	A	2.2
LISP	MVS	C	---
MARKEXAM	MVS	C	---
PL/C	MVS	C	---
PL/I CHECKOUT COMPILER	MVS	B	1.3.0
	VM/CMS	B	1.3.0
PL/I OPT COMPILER	MVS	B	1.5.1
	VM/CMS	B	1.5.1
REXX	VM/CMS	A	---
SNOBOL 4	MVS	C	3.5
	VM/CMS	C	3.5
SPITBOL	MVS	C	---
Turing	VM/CMS	C	---
UTCS FORTRAN UTILITIES	MVS	B	---
VS COBOL	MVS	C	2.4
VS FORTRAN	MVS	A	1.4.1
	VM/CMS	A	1.4.1
VS Pascal	VM/CMS	C	2.2
WATBOL	MVS	C	V3L2
Waterloo C	VM/CMS	C	1.3
WATFIV	MVS	B	---
	VM/CMS	C	V2L0
WATFOR-77	VM/CMS	A	1.3
cc	UNIX	A	---
f77	UNIX	C	---
ratfor	UNIX	C	BSD std.
ttc	UNIX	C	---
pc	UNIX	C	BSD std.
yacc	UNIX	C	---
awk	UNIX	C	---
adb,dbx	UNIX	C	BSD std.
Numerical			
DYNAMO	MVS	B	4.07
EISPACK	MVS	C	4
FORMAC	MVS	C	---
FUNPACK	MVS	C	---
GPSS	MVS	A	Rel.1, Mod. Level 4
IMSL	MVS	A	9.2
	VM/CMS	A	9.2

Software List continued

Package/Compiler	System	Support	Version
LINPACK	MVS	C	---
	VM/CMS	C	---
MINOS	MVS	C	4.0
MINPACK	MVS	C	1
MPSX	MVS	C	Rel.1, Mod. Level 6
NAg	MVS	A	Mark 11
Statistical			
BMD	MVS	C	---
BMDP	MVS	A	Level 85, Level 87
	VM/CMS	A	Level 83, Level 85
GENSTAT	MVS	C	4.04B
Minitab	VM/CMS	B	5.1
NAg	MVS	A	Mark 11
NTSYS	MVS	C	Dec. 1982
SAS	MVS	A	5.16
	VM/CMS	A	5.16
SPSS	MVS	C	9.1
SPSS^x	MVS	A	2.2
	VM/CMS	A	2.2
TSP	MVS	C	3.5
Text Processing			
COGS (Concordance Generating System)	MVS	B	3.1
KWIC	MVS	C	---
OCP (Oxford Concordance Program)	MVS	C	1.4
SCRIBE	VM/CMS	A	4(1400)-1
Waterloo SCRIPT	MVS	B	85.1
	VM/CMS	B	86.1
XEDIT	VM/CMS	A	---
8700 Pseudotypesetting	VM/CMS	A	n/a
MICROLASER	VM/CMS	A	---
ed	UNIX	A	---
vi	UNIX	C	---
cmacs	UNIX	C	---
spell	UNIX	C	---
diction/explain	UNIX	C	---
eqn	UNIX	A	---
tbl	UNIX	A	---
pic	UNIX	C	---
troff	UNIX	A	---
nroff	UNIX	A	---
TeX	UNIX	C	---
Utilities			
DFSORT	MVS	A	6.0
DSMAP	MVS	A	---
FILEBOL	MVS	C	---
FORTUTILS	VM/CMS	A	2.2
GRIPE	MVS	A	---
IBM UTILITIES	MVS		---
IEBGENER	MVS	A	---
IEBCOPY	MVS	A	---
IEHMOVE	MVS	A	---
TAPEPRT	MVS	A	---
TAPEEXRAY	MVS	A	---
TCOPY	MVS	A	---
TPRINT	VM/CMS	C	---
UTCS FORTRAN UTILITIES	MVS	B	---
crypt	UNIX	A	BSD std.
compress	UNIX	C	BSD std.
csh	UNIX	B	BSD std.
diff	UNIX	A	BSD std.
grep	UNIX	A	BSD std.
ipr	UNIX	B	---
learn	UNIX	C	BSD std.
patch	UNIX	C	---
sed	UNIX	A	BSD std.
sort	UNIX	A	BSD std.
sh	UNIX	A	BSD std.
tar	UNIX	A	BSD std.
uniq	UNIX	A	BSD std.

Software List continued

SOFTWARE LIST for MICROCOMPUTERS

The following are microcomputer software packages for which UTCS can provide either support or some information. As with mainframe products, micro packages receive full support (Class A), limited support (Class B), or no active support (Class C). The specific criteria differ from those for mainframe classes and are outlined in the *Academic's Guide to Microcomputer Systems.*

Package/Compiler	Support	Version
Communications		
Kermit (MS-DOS)	A	2.27d
Kermit (APPLE II)	A	---
Kermit (CP/M)	C	---
Kermit (Macintosh)	B	---
PC TALK3	C	---
PC PLOT III	A	---
ProComm	A	2.42 UT
MacTerminal	B	---
WYLBUR/PC	C	---
Database Managers		
AskSam	C	2.2
Clipper	B	---
DATAEASE	B	---
dBASE II (CP/M)	B	---
dBASE II (MS-DOS)	C	--
dBASE III	A	1.1
dBASE III Plus	B	---
dBIIICompiler	C	1.1
FoxBASE	C	2.14u
Notebook II	B	2.03
REFLEX	B	---
ViewFinder III	B	---
ZyINDEX	B	---
Graphics		
DR HALO	C	---
Lotus 1-2-3	B	---
Microsoft CHART (Macintosh)		C
MacPaint	B	---
WATCOM GKS	B	---
35mm Express	B	---
Languages		
BASIC	A	---
Microsoft FORTRAN	C	---
TURBO Pascal	B	---
WATFOR-77	A	---
Operating Systems, Utilities		
APPLE Turnover (Macintosh)	A	---
CP/M	B	---
FASTBACK	B	---
PC-DOS	A	---
Sidekick	B	---
SuperKey	C	---
TURBO Lightning	C	---
XenoDisk	A	1.41
Spreadsheet		
APPLEWORKS	C	---
Lotus 1-2-3	B	2.01
Multiplan (Macintosh)	C	---
Statistical		
Minitab	C	---
PowerStat	C	1.04
SAS/PC	A	6.02
SPSS/PC +	A	---
STATPRO	C	2.0c
Word Processing		
Gutenberg Senior	C	---
FinalWord II	B	2.0
MacWrite	C	---
Microsoft Word (Macintosh)		A
Microsoft Word (MS-DOS)	B	2.0
Nota Bene	B	---
T^3	C	---
Volkswriter Scientific	C	---
WordPerfect	A	4.1; 4.2
WordStar	B	---

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